INSIDE: KEEPING BIRDS OUT OF OUTHOUSES

Montana Outdoors

MONTANA FISH, WILDLIFE & PARKS | $3.50

MARCH–APRIL 2018

CAN WE COEXIST?

Resolving conflicts in Montana's growing grizzly country

IN THIS ISSUE:

"SEE ANY WOLVES?"
HELPING OUT AT STATE PARKS
A BETTER STREAM FOR COWS AND TROUT
FWP: PREPARED FOR DISEASE OUTBREAKS

Montana Fish, Wildlife & Parks

FIRST PLACE MAGAZINE: 2005, 2006, 2008, 2011, 2017
SECOND PLACE MAGAZINE: 2007, 2009, 2012, 2015, 2016
Awarded by the Association for Conservation Information

FIRST PLACE MAGAZINE: 2012
Awarded by the National Association of Government Communicators

MONTANA OUTDOORS
VOLUME 49, NUMBER 2

STATE OF MONTANA
Steve Bullock, Governor

MONTANA FISH, WILDLIFE & PARKS
Martha Williams, Director

MONTANA OUTDOORS STAFF
Tom Dickson, Editor
Luke Duran, Art Director
Angie Howell, Circulation Coordinator

MONTANA FISH AND WILDLIFE COMMISSION
Dan Vermillion, Chair
Tim Aldrich
Logan Brower
Shane Colton
Richard Stuker

MONTANA STATE PARKS AND RECREATION BOARD
Angie Grove, Chair
Jeff Welch
Mary Sheehy Moe
Betty Stone
Scott Brown

Montana Outdoors (ISSN 0027-0016) is published bimonthly by Montana Fish, Wildlife & Parks. Subscription rates are $12 for one year, $20 for two years, and $27 for three years. (Please add $3 per year for Canadian subscriptions. All other foreign subscriptions, airmail only, are $48 for one year.) Individual copies and back issues cost $4.50 each (includes postage). Although ***Montana Outdoors*** is copyrighted, permission to reprint articles is available by writing our office or phoning us at (406) 495-3257. All correspondence should be addressed to: ***Montana Outdoors***, Montana Fish, Wildlife & Parks, 930 West Custer Avenue, P.O. Box 200701, Helena, MT 59620-0701. Website: **fwp.mt.gov/mtoutdoors**. Email: **montanaoutdoors@mt.gov**.

©2018, Montana Fish, Wildlife & Parks. All rights reserved.

For address changes or subscription information call **800-678-6668**.
In Canada call **1+ 406-495-3257**

Postmaster: Send address changes to ***Montana Outdoors***, Montana Fish, Wildlife & Parks, P.O. Box 200701, Helena, MT 59620-0701. Preferred periodicals postage paid at Helena, MT 59601, and additional mailing offices.

FSC MIX Paper FSC® C007548

Montana Outdoors

MARCH–APRIL 2018

FEATURES

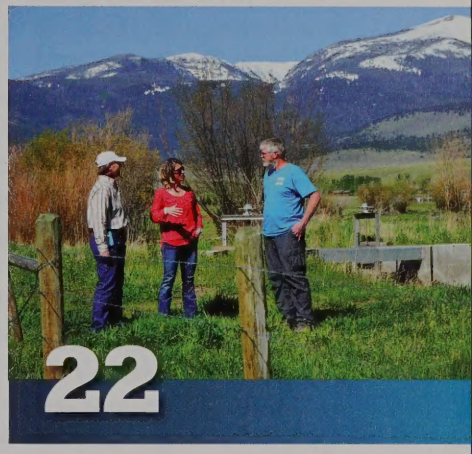
10 Bursting at the Seams Whether or not the ever-expanding Northern Continental Divide Ecosystem grizzly population is delisted, FWP will continue to resolve problems between bears and people. *By Tom Dickson*

19 This Is Not Okay FWP teams up with Teton Raptor Center to prevent birds from dying a slow, horrific death in outhouses at state parks and fishing access sites across Montana. *By Kelsey Dayton*

22 Happy Cows, Happy Trout How a watershed coordinator, a rancher, and an FWP fisheries biologist found a way to conserve water and restore habitat on a Madison River tributary. *By John Grassy. Photos by Eliza Wiley*

28 Ready, Willing, and Able Volunteers offer their time, expertise, and passion to help visitors enjoy Montana state parks. *By Laura Lundquist*

36 Counting Wolves by Phone How scientists at the University of Montana, FWP, and the U.S. Geological Survey created a more accurate and cost-effective way to monitor the state's wolf population. *By Paul Queneau*



DEPARTMENTS

2 LETTERS

3 EATING THE OUTDOORS Fast, Fabulous Venison Stroganoff

4 OUR POINT OF VIEW CWD Outbreak: We've Got This Covered

5 FWP AT WORK Jason Parke, FWP Forester

6 SNAPSHOT

8 OUTDOORS REPORT

40 THE SKETCHBOOK Building Confidence with Science

41 OUTDOORS PORTRAIT Red Crossbill

1 OF 800 A wolf runs through a forest in western Montana. See page 36 to learn how scientists count Montana's wolf population each year. Photo by Jeremie Hollman

FRONT COVER Grizzly bears are steadily spreading out from their core mountain habitat. See how FWP is helping landowners and others coexist with Montana's state animal. Photo by Dawn Y. Wilson.

Ready ramp

In the article "Moving Meat" (September-October 2017), you mention bringing ramps to help load large animals into a truck. What I do is use the ramp every pickup truck comes with: the tailgate. I simply remove the tailgate and lay one end on the rear bumper and the other on the ground. Bingo, a ramp. I have loaded large deer and medium-sized elk by myself this way. Also, I would never use the gutless field dressing method you promote because it seems to waste the rib meat, heart, and liver.

Steve Bosch
Amboy, WA

Editor replies: The tailgate is a great suggestion. Regarding gutless field dressing and waste, the rib meat is easily accessed after you peel the skin away from the body. So are the heart and liver. Saw up through the breastbone and open the chest cavity as you would with regular field dressing. It takes some practice, but it's also not hard to retrieve the tenderloins. Cut around the diaphragm, reach in along the inner spine, and pull them out.

Revelatory road trip

After reading the essay, "Doing Just Fine" (November-December 2017), I was reminded of a cold night in the Gallatin Valley some years back. The mercury had dropped to 40 below. Maybe not the brightest of ideas, but on that cloudless, bitterly cold morning my wife and I decided to take a road trip. I wired a piece of cardboard in the grill of our SUV and threw a couple of sleeping bags in the back seat as a precaution.

We drove south into the Gallatin Canyon. At the Big Sky intersection, we spotted a band of bighorn sheep feeding on the hillside. We started talking about how brutal the previous night must have been for those animals. But then we realized that those sheep can survive almost anything that nature has to offer, as your essay explains. Their lives weren't hanging by a thread, as ours would have been after spending a night out in those conditions. Thanks for the interesting essay and the great photography that went with it.

Robert Tinker
Englewood, FL

Belated thanks

Regarding your article on the licensing process in the "The Big Day" (May-June 2017): I can't believe people who don't receive a license in your lotteries actually call and complain. For more than 20 years, I applied unsuccessfully for a Montana moose license and never once considered phoning to gripe that I didn't get one. I finally drew a moose license in 2015, and I wish I'd called then to let your License Bureau crews know that I cried and went bananas when I saw my tag in the mail. The systems works. A person just has to keep applying. So here's a belated thank you. You can be sure that when I draw my bighorn ram tag—hey, you never know—I will call you that very minute and freak out over the phone. By the way, the moose I shot was a beautiful dream bull with a 44-inch-wide rack.

> "I wish I had called to let your License Bureau crews know that I cried and went bananas when I saw my moose tag.

Bonnie Potter
Roundup

Different picture on elk and roads

A caption below a photo in the article "Where To Hunt Elk in Montana" (September-October 2017) states: "After picking a national forest as close to home as possible—to reduce driving time—examine the map for routes closed to motorized vehicles. That's where the elk are." This statement is false and portrays an attitude that motorized use of our public lands displaces wildlife and elk. I sponsored HJ 13 in the 2015 Montana legislative session and the results of this study show a completely different picture. The U.S. Forest Service has closed over 20,000 miles of roads in Montana to motorized vehicles in the last 20 years. Did wildlife and elk numbers increase on these lands? No. According to the study, wildlife has decreased their occupancy on public lands and have been migrating to private lands. Private lands have more development, more roads, and more motorized vehicle and equipment use, and yet wildlife are moving to and toward these areas.

Rep. Kerry White
Bozeman

Not missing the gloss

After looking at the cover of the 2018 photo issue, I wanted to compliment you on the new cover treatment you've been using. The new matte cover is far better than the old glossy one you previously used. It makes a classy magazine even classier.

Greg Munther
Missoula

Likes the grizzly commentary

Director Martha Williams's column on the grizzly bear situation ("Protecting grizzlies while keeping people safe," November-December 2017) was timely, appropriate, and educational. Thank you very much.

Harold Johns
Butte

Corrections

Several readers noted that the bush on page 14 of the 2018 photo issue is a black hawthorn, not a huckleberry. Others pointed out that the bird on page 8 is a dusky (blue) grouse, not a spruce grouse. Several also chided us for running a photo of fisheries biologists not wearing PFDs on page 5 of the September-October 2017 issue and showing two hunters on page 13 of that same issue not wearing blaze orange. Finally, the tree on page 9 of the November-December issue is a subalpine fir, not a subalpine pine, a species that does not exist.

Fast, Fabulous Venison Stroganoff

Preparation time: 10 minutes | Cooking time: 16–18 minutes | Serves 4

SHUTTERSTOCK

When I search for new game recipes, I'm looking for ones that are both fast and fabulous. I want a dish I can whip up in an hour or less after coming home from work (not including defrost time). And I want something delicious enough to garner praise from my wife or guests.

Finding that combination isn't easy. Plenty of game recipes, usually from the 1970s and before, require no more than opening a can of cream of mushroom soup, pouring it over a pound of game meat, then baking for 45 minutes or so.

Fast, sure. But not exactly mouthwatering.

Many recent game cookbooks showcase unique and delicious flavors of game, introducing home chefs to new ingredients and techniques. Yet these recipes are often complex and can take hours if not days to prepare. One cookbook's Pit-Roasted Saddle of Venison begins with "Dig a four-foot-deep pit."

Which is fine, if you have hours of extra time. But what if you're in a hurry and still want a delicious meal?

Fast and fabulous come together in this venison stroganoff recipe. I've served the dish countless times to family and friends since I learned it in 1998. I've tweaked the ingredients several times and now have what I consider the ultimate after-work stroganoff recipe. Save your pit digging for the weekend.

—Tom Dickson

INGREDIENTS

- 1½ lb. venison steaks or roast (or beef sirloin), cut into 2-inch-long, ¼-inch-thick strips
- 1 c. flour, seasoned liberally with salt and pepper
- 6 T. vegetable oil
- 1½ c. yellow onion, thinly sliced
- 8 oz. mushrooms (button or crimini), sliced
- 1 T. tomato paste
- 1 T. brown or Dijon mustard
- 1 T. brown sugar
- 1½ c. beef stock
- 1 T. vermouth or dry sherry (optional)
- 3 T. sour cream
- 3 T. fresh parsley, chopped

DIRECTIONS

Start heating 2 T. oil in a large skillet or saucepan over medium-high heat.

Meanwhile, dredge half the venison strips in flour. Shake off excess.

Sauté strips for 2-3 minutes, turning halfway. Remove meat from pan.

Wipe pan clean. Add 2 T. oil. Repeat with second batch of strips. Remove meat.

Add remaining 2 T. oil. Reduce heat to medium. Sauté onion 5 minutes. Add mushrooms and sauté another 3 minutes.

Stir in tomato paste, mustard, and brown sugar. Cook 1 minute. Add stock and the optional vermouth or sherry, scraping up the browned bits ("fond") on the pan bottom. Bring to a boil.

Return meat to pan, reduce heat to low, and let simmer 3 minutes. Stir in sour cream. Sprinkle on parsley. Serve over egg noodles or mashed potatoes.

Mashed "Faux-tatoes"

This is a great mashed potato substitute for those watching their carbs:

Add a pound of cauliflower florets to a pot of boiling water. Boil 6 minutes. Drain. Over medium heat, break down the florets with a pastry cutter or potato masher, stirring constantly for 5 minutes to remove moisture. Add 2 T. cream cheese, ½ t. minced garlic, ¼ c. parmesan cheese, 1 t. black pepper, and ⅛ t. chicken boullion and blend with a hand mixer or immersion blender.

CWD outbreak: we've got this covered

We always knew it would show up someday, but it was still a big disappointment when it finally arrived.

On November 7, 2017, while the Montana Fish and Wildlife Commission and senior FWP officials were listening to a presentation on chronic wasting disease (CWD), FWP Wildlife Division administrator Ken McDonald received a text: Scientists had detected CWD in a mule deer shot 40 miles south of Billings, near the Wyoming border.

It was the first case in Montana history of the fatal disease detected in a wild population.

By the end of the day, FWP had formed a CWD incident command team and was carrying out the response plan we had developed earlier in the event of an outbreak.

For years, Montana has been surrounded by states and provinces where CWD exists in wild or farmed deer or elk. From 1998 to 2016, FWP tested more than 17,000 wild deer, elk, and moose for CWD. We found no positive results, but we knew it was only a matter of time. The infected deer turned up after we renewed surveillance in 2017.

CWD disease is fatal to deer and elk. So far, there have been no cases in the United States of it affecting humans who eat meat from infected animals.

GRIM REALITY FWP veterinarian Jennifer Ramsey removes brain tissue from a deer head, part of the agency's rapid response to a recent CWD outbreak.

FWP developed a response plan in 2005 with help from a citizen advisory committee that included representatives from the Rocky Mountain Elk Foundation, the Mule Deer Foundation, ranchers, and others. The plan, revised in 2017 with help from a new advisory council, calls for interagency cooperation among FWP and the Montana Departments of Livestock, Health and Human Services, and Environmental Quality, as well as county commissioners, Indian tribes, and other partner agencies and organizations.

In accordance with the plan, we rapidly instituted a special hunt in the area where the initial deer and three others that later tested positive for the disease were harvested. We conducted another special hunt in north-central Montana after a deer, harvested north of Chester along the Hi-Line, also tested positive.

FWP wildlife biologists, wildlife technicians, game wardens, and other employees worked with landowners, meat processors, counties, and other state agencies to provide information about the hunts, set up check stations, enforce regulations, and gather lymph node samples from harvested deer. Some 1,400 hunters participated in the hunts.

The hunts were designed to obtain a statistically valid sample of deer so our scientists can determine CWD prevalence in the areas where the disease was detected. Testing harvested deer will help us determine what percentage of the population is infected and to what extent the disease has spread. This information will help wildlife managers develop an accurate and efficient long-term disease-management strategy for the affected areas.

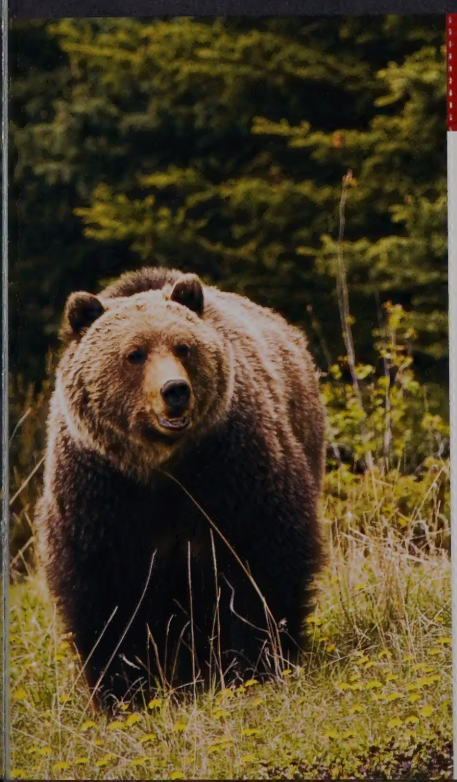
Unfortunately, once CWD afflicts a deer or elk population, it can't be eradicated. But by quickly instituting the two sampling hunts, we increased the odds of keeping prevalence low and preventing the disease from spreading. It was an extraordinary achievement under such short notice, and I am extremely proud of our employees for their fast, efficient, and professional response to this disease discovery.

Proud, but in no way surprised. Responding to and managing disease outbreaks is exactly what FWP is set up to do. We anticipate, plan, execute, and evaluate. We've dealt with outbreaks of brucellosis in bison and elk, epizootic hemorrhagic disease in deer, pneumonia in wild sheep, whirling disease in wild rainbow trout, avian cholera, botulism, Newcastle disease, West Nile virus, and parasite infestations on the upper Yellowstone River fisheries. And we're well prepared to respond to future outbreaks of these and other diseases.

CWD is now in Montana, and the state will need to learn how to live with it, just as other states and provinces have done. FWP will continue targeted surveillance where we think CWD is likely to show up. We'll keep talking to other state and provincial conservation agencies to find out which management strategies work best. We'll carry out special hunts and other management actions, while continuing to learn from and contribute to CWD science, so we can do everything possible to limit the spread of this disease to Montana's deer and elk populations.

—**Martha Williams**, Director, Montana Fish, Wildlife & Parks

LAURA LUNDQUIST



Don't miss a single issue: **Subscribe today!**

YES! I'd like a year (six issues) of *Montana Outdoors* for just $12.

My/Donor Information: (Required for gift subscription)

Name

Address

City State Zip

Select: 1 Year *6/$12* 2 Years *12/$20* 3 Years *18/$27*

Send a Gift to: (Please print)

Name

Address

City State Zip

Select: 1 Year *6/$12* 2 Years *12/$20* 3 Years *18/$27*

Best Deal!

Payment enclosed Bill me later

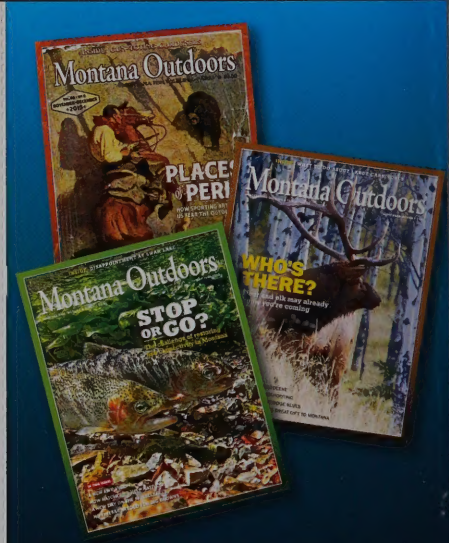
Add $3 per year for Canadian subscriptions.
All other foreign subscriptions are $48/year, paid in advance.

For faster service, subscribe by phone: **(800) 678-6668**
Or subscribe on-line: **fwp.mt.gov/mtoutdoors**

U17A

Place
Stamp
Here

MONTANA OUTDOORS
MONTANA FISH WILDLIFE & PARKS
930 W CUSTER AVE
PO BOX 200701
HELENA MT 59620-0701



Subscribe today and you'll receive the latest on Montana's:

- fish and wildlife management
- conservation issues and activities
- hunting, fishing, and wildlife watching

Plus the annual photo issue!

THOM BRIDGE

TREE TENDER

JASON PARKE FWP Forester, Helena

As FWP's first—and only—forester, my main job is to oversee forest management on state wildlife management areas (WMAs). That sometimes involves designing and overseeing carefully prescribed timber harvest. Many people aren't aware that selectively cutting trees can benefit wildlife. For instance, we might want to prune back conifers expanding into grasslands and shrublands that elk and mule deer use.

In this photo, I'm taking a core sample that tells me how old the tree is. By aging trees on WMAs, we can learn things like how long they've been growing in open habitats.

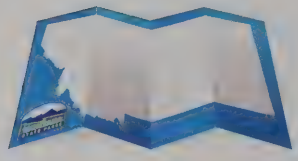
We look at conifers differently depending on the region. For instance, in the northwest, we try to encourage Douglas fir regeneration, while at Blackfoot-Clearwater WMA near Ovando, we want to get rid of conifers that are overtaking prairie and aspen stands.

Because of FWP's mission, wildlife habitat is the main lens I use to view any timber harvest on WMAs. But I also consider insect and disease issues, fuel reduction where residences are nearby, and how timber harvest might help pay for habitat enhancement projects. I also help our Parks and Fisheries Divisions manage forests on state parks and fishing access sites.

Photographer **Brett Swain** was looking for elk and white-tailed deer in late winter near the National Bison Range north of Missoula when he saw these five Hungarian partridge, feeding in a snow-covered stubble field close to the road. "I watched them for about 45 minutes," says Swain, who lives near Kalispell. "That one bird moved off to the side and stood there watching, while the other four continued feeding. I waited until the others were down and snapped this image. I like the juxtaposition of the one bird with the others—I call this shot 'The Sentinel'—and also how the snow acts as a blank canvas so you can see the feather color and detail with no visual distraction." ■

55

Number of state parks in Montana (compared to 30 in Idaho, 40 in Wyoming, and 44 in Colorado)



PARK-NERSHIPS

In mid-January, Governor Steve Bullock announced creation of the Montana Parks in Focus Commission. The 12-member advisory panel's task is to identify new "public-private partnerships" that will provide additional funding and stewardship for the FWP Parks Division.

Visits to Montana's 55 state parks have doubled in the past 10 years. Yet revenue has not kept up with costs for infrastructure repair, maintenance, staffing, and day-to-day operations.

Bullock said the new commission will conduct public hearings across Montana throughout 2018 to solicit funding and partnership ideas.

Working with the five-person FWP Parks and Recreation Board, the new commission will then prepare and deliver final recommendations to the governor in December. ■

WEATHER

Drought, winter may have hurt prairie game populations

Don't be surprised if you see fewer deer and upland birds in eastern Montana this spring. Though biologists have yet to finish computing winter aerial surveys and other population monitoring, the combination of last year's parched summer followed by a harsh winter no doubt took its toll.

"Some effects of the drought were immediate last summer, like low chick survival for pheasants and sharptails," says Melissa Foster, FWP wildlife biologist in Baker. "The lack of moisture meant fewer bugs, which provide the protein that's critical for chicks during the first few weeks of life."

Foster says drought takes a bit longer to affect deer. "It left many in poorer-than-average condition going in to winter. Fawns were noticeably smaller than normal." Because deer make it through the cold months mainly on fat reserves, Foster says the skinniest animals often don't survive. Though snow depth was not severe, winter temperatures plummeted to -30 F and lower in parts of eastern Montana this past winter. "That causes deer to burn up precious calories at a much faster rate," Foster says. "Because of poor grazing conditions in 2017, some had nothing to spare."

An added blow was the emergency haying and grazing allowed on federal Conservation Reserve Program grasslands. "That was necessary to help ranchers stay afloat, but it reduced cover for wildlife," Foster says. "Without adequate cover, ground-nesting birds are vulnerable to predators. It's the same with newborn fawns. They need to hide from coyotes and other predators by holding still in thick stands of grass."

Foster is keeping her fingers crossed for a wet 2018. "Prairie species bounce back quickly," she says. "An early spring and good nesting and brood conditions could mean lots of young upland birds and deer next fall." ■

Eastern Montana upland bird populations took a beating during last summer's drought. But they could bounce back with ample water this spring.

CLOCKWISE FROM TOP LEFT | ARTOON ILLUSTRATION BY MIKE MORAN; USFA; PAUL N. GUENO; WHITETAIL

POPULATION MONITORING

EYES in the SKY

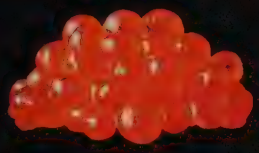
If you see an FWP airplane or helicopter flying overhead this time of year, give the pilot and biologist up there a wave. They are counting elk, deer, waterfowl, mountain goats, bighorn sheep, moose, and other game species.

Airplanes work best for open areas where wildlife is spread out. Helicopters are preferred for thick forest, where pilots have to hover or quickly maneuver so they and biologists can see and identify animals.

FWP crews count the ratio of calves per 100 adult cow elk or moose. This indicates population status and helps biologists determine how many animals can be harvested the following hunting season.

To monitor mule deer, biologists conduct aerial surveys in late winter and early spring. Because it's impossible to tally every deer, biologists count muleys in the same specific "trend areas" each year. "That helps us determine whether the overall mule deer population trend from year to year is increasing, decreasing, or staying stable," says John Vore, FWP Game Management Bureau chief. ■

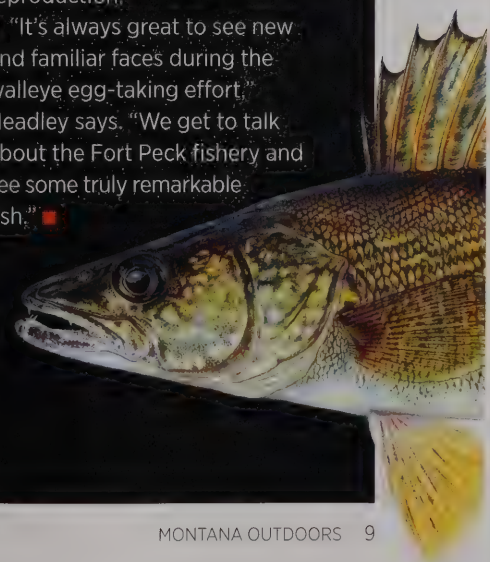
HELPING HARVEST WALLEYE EGGS



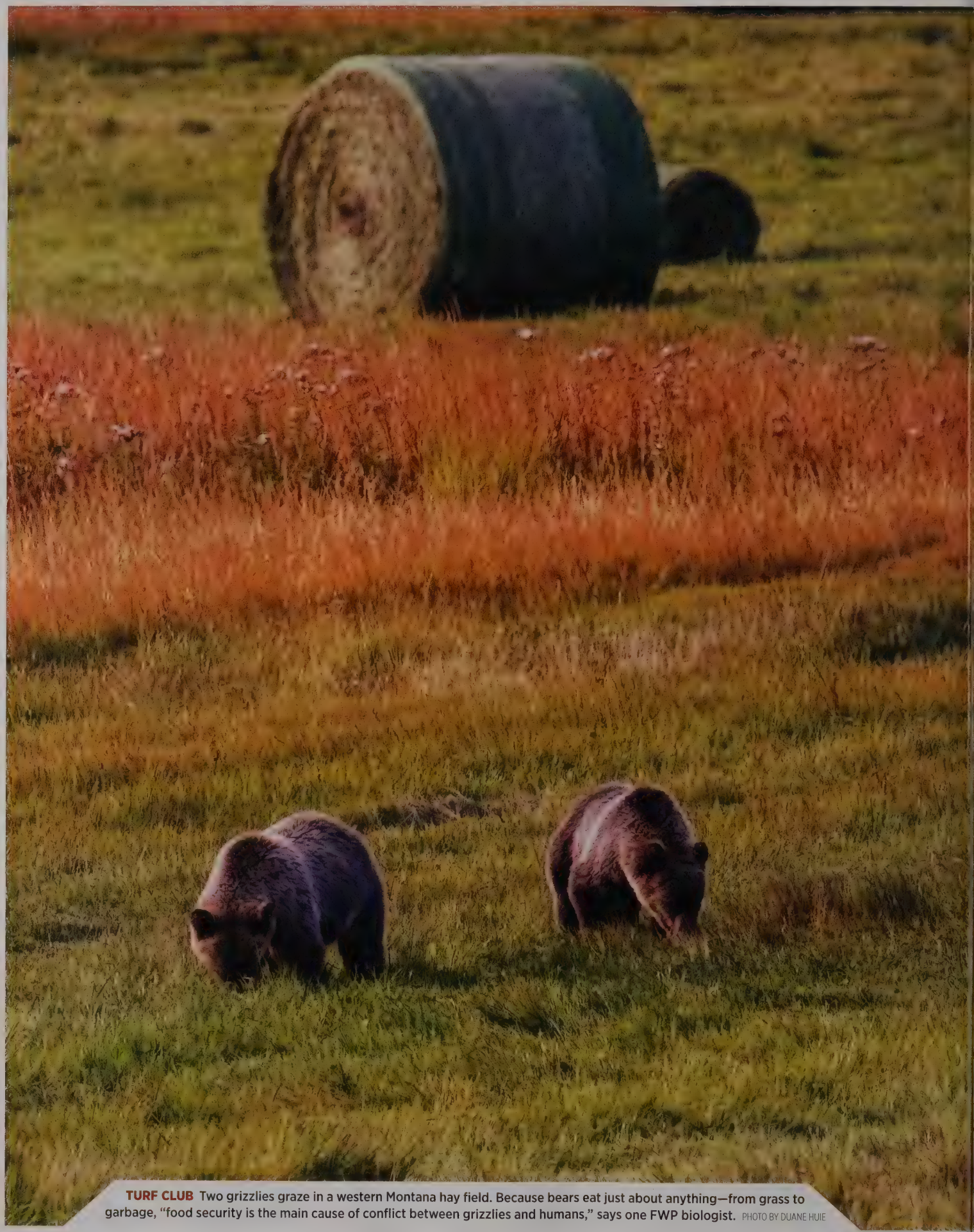
Up to 100 volunteers pitch in this time of year to help FWP fisheries and hatchery crews collect eggs from walleye at Fort Peck Reservoir. The egg-taking operation, which harvests up to 90 million eggs, requires months of planning. "It's a big operation that takes lots of teamwork," says Heath Headley, Fort Peck Reservoir fisheries biologist.

In early spring, walleye move to shallow water to spawn. Because Fort Peck contains little spawning habitat, FWP crews and volunteers give the fish a helping hand. The volunteers—who range in age from school kids to retirees—help set trap nets and then separate out captured "nontarget species" such as catfish and freshwater drum. FWP biologists and technicians squeeze eggs from the female walleye—which can top 14 pounds—then mix the eggs with milt from male fish. The fertilized eggs are incubated at the Fort Peck and Miles City Fish Hatcheries. Tiny walleye are then stocked in lakes and reservoirs that lack natural reproduction.

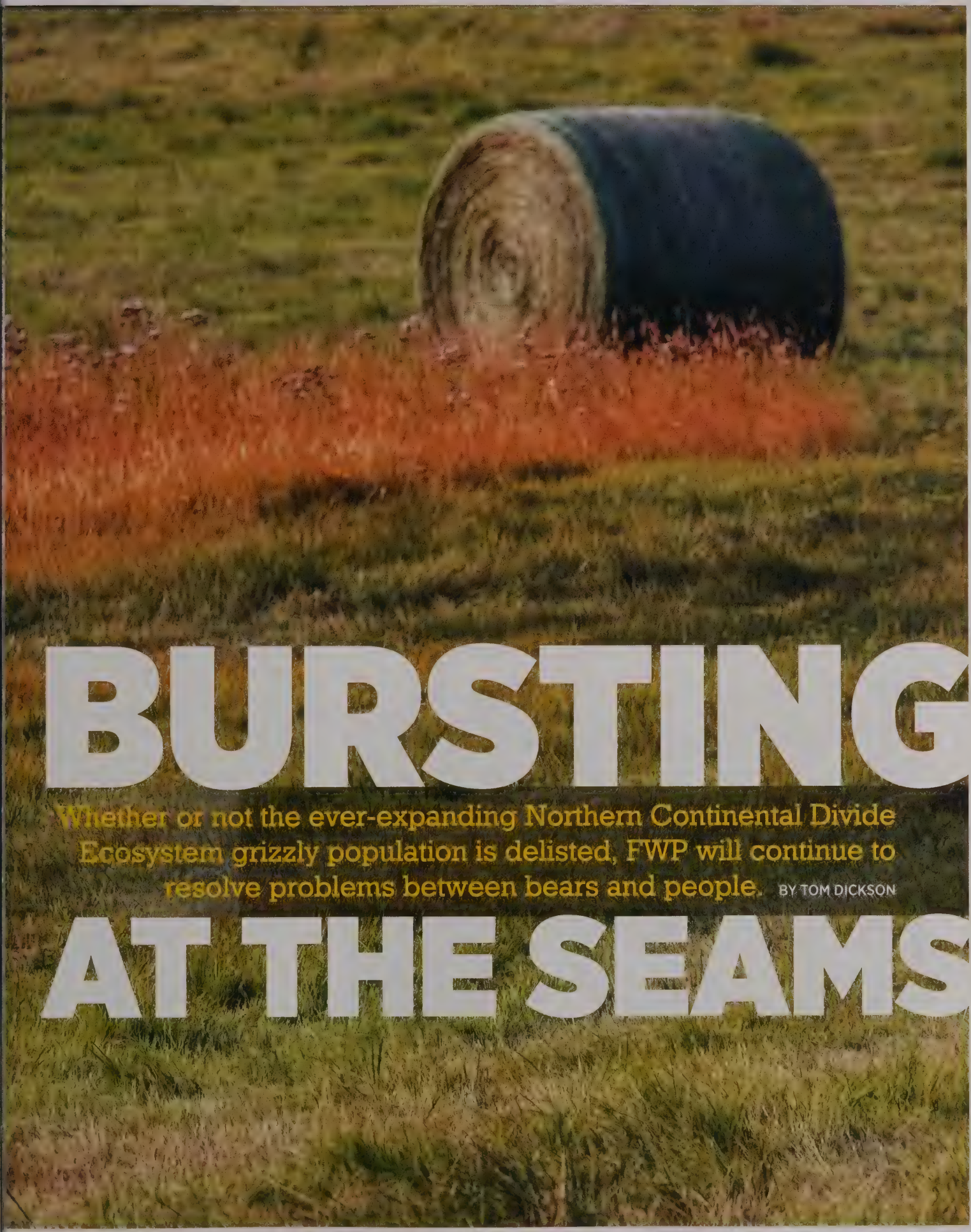
"It's always great to see new and familiar faces during the walleye egg-taking effort," Headley says. "We get to talk about the Fort Peck fishery and see some truly remarkable fish." ■



CLOCKWISE FROM TOP LEFT: CARTOON ILLUSTRATION BY MIKE MORAN; USDA; PAUL N. QUENEAU; SHUTTERSTOCK; JOSEPH TOMELLERI; DAVID R. ARMER



TURF CLUB Two grizzlies graze in a western Montana hay field. Because bears eat just about anything—from grass to garbage, "food security is the main cause of conflict between grizzlies and humans," says one FWP biologist. PHOTO BY DUANE HUIE



BURSTING AT THE SEAMS

Whether or not the ever-expanding Northern Continental Divide Ecosystem grizzly population is delisted, FWP will continue to resolve problems between bears and people. BY TOM DICKSON

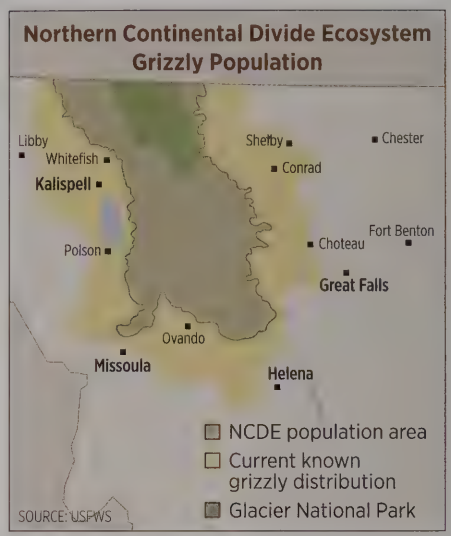
If ever a place was ripe for grizzly problems, it's Two Creek Monture Ranch. Surrounding the 21,000-acre cattle operation, about 50 miles east of Missoula, are the storied Blackfoot River and state and federal wildlife lands, forests, and wilderness. Deer, elk, and 900 cattle graze the ranch's rolling pasture amid stands of 100-foot-tall ponderosa pines. In summer the ranch is also home to 15 to 20 grizzlies. The bears are part of a 1,000-strong population living in the 96,000-square-mile Northern Continental Divide Ecosystem (NCDE), a rugged, mostly mountainous region that extends north from the Blackfoot Valley into Alberta and British Columbia.

So it's no surprise that Two Creek Monture has lost cattle to bears: The large carnivores killed four calves in 1998 when grizzlies first showed up on the ranch. "That first year it was very spooky, going out to the calving lot and shining a light in the face of a bear," says Wayne Slaght, ranch manager. "We were scared. And we were mad that we now had to deal with bears." Since then, grizzly numbers have more than tripled in the Blackfoot Valley.

Yet Two Creek Monture Ranch has not lost a single cow to grizzlies for 20 years.

> "You can fight it or you can deal with it. And fighting just isn't going to work."

RESOURCEFUL RANCHER Working with FWP bear specialists and federal biologists, Wayne Slaght, manager of the Two Creek Monture Ranch near Ovando, has eliminated cattle depredation despite having 15 to 20 grizzlies on the property. The ranch uses a combination of electric fences, rapid cattle carcass removal, and tight grain storage to keep bears from getting into trouble.



The reason? Three miles of electric fence, tight grain storage, and prompt livestock carcass removal. "I know that ranchers in other parts of the state are having a hard time with bears," says Slaght, a board member of the Montana Stockgrowers Association. "But you can fight it or you can deal with it. And fighting just isn't going to work."

Across western and parts of central Montana, increasing numbers of people are learning how to live with grizzlies. Over the past decade, the federally protected NCDE population has grown by 38 percent and expanded its range by 60 percent. "It's one of Montana's great wildlife conservation achievements," says Ken McDonald, head of the Montana Fish, Wildlife & Parks Wildlife Division. The U.S. Fish & Wildlife Service (USFWS) is now considering a proposal for removing the population from the federal list of threatened species, a decision known as delisting.

Whether or not the NCDE population is delisted, FWP officials say the department will continue to manage grizzlies. That includes helping people learn how to prevent bear conflicts and rapidly resolving problems when they do occur. "That's the only way to build the local tolerance necessary for NCDE population expansion and connectivity with other federal grizzly recovery areas," McDonald says. "When there's a conflict, our bear specialists move in quickly and resolve the issue before it reaches a point where the bear has to be killed."

LEFT TO RIGHT: LAURA NELSON; TOM DICKSON/*MONTANA OUTDOORS*; DONALD M. JONES

"This is how it starts."

BAD BEGINNING Tim Manley, FWP bear management specialist in Kalispell, points to grizzly tracks near a trash bin in Whitefish. Garbage security is key to reducing bear problems, he says.

FED BEAR EQUALS DEAD BEAR

Tim Manley is telling me about garbage. Manley is one of five FWP bear management specialists who, along with tribal and federal counterparts, work with communities and landowners in and around the NCDE. Their primary task is to reduce problems, or "conflicts," between bears and people.

Early one morning as we drive through Whitefish, a ski resort town of about 7,500 people just west of Glacier National Park, Manley tells me the primary reason grizzly bears get into trouble is food. "One of the hardest things to get people to understand is that grizzlies are omnivores that eat just about anything," he says.

Bears gobble up garbage, animal carcasses, beehives, row crops (including lentils, alfalfa, oats, wheat, and corn), tree fruit, bird seed in feeders, and dog food left on back porches. A colleague of Manley's calls the region's growing number of backyard chickens "grizzly bear gateway drugs."

Bears addicted to poultry, trash, or other human-produced foods must be trapped and sometimes euthanized to safeguard the public. Lured to neighborhoods by garbage, the large carnivores can end up on a house deck, pawing at the door. "People don't think they are feeding bears, but by not securing garbage and other foods, they actually are—and writing the bear's death sentence," says Manley.

A few minutes later, we round a corner in a quiet Whitefish neighborhood that abuts the Flathead National Forest and see a toppled trash bin, pizza crusts and eggshells strewn about. Manley inspects the mess and points to a muddy grizzly paw print near the lid. "This is how it starts," he says.

For thousands of years, indigenous people revered and co-existed with grizzlies. New arrivals to the American frontier were far less accommodating. Scientists estimate that 50,000 to 100,000 grizzlies lived in today's lower 48 states before European settlement, ranging from the Mississippi River west to the Pacific Ocean. Within a century, fewer than 1,000 bears remained.

The large carnivores were seen as threats to roads, railroads, mines, farms, towns, and ranches. The Great Plains, where in the early 19th century Lewis and Clark regularly encountered grizzlies, became home to combines, cattle, and communities. Wherever people went, they killed bears to protect themselves, livestock, crops, and other property. Grizzlies were eliminated everywhere except in and around Glacier and Yellowstone National Parks and remote forests in the Rocky Mountains.

In 1975, the federal government listed the grizzly as threatened under the two-year-old Endangered Species Act.

In its 1993 grizzly recovery plan, the USFWS identified several recovery areas in Montana, Idaho, Wyoming, and Washington where grizzlies still roamed or that contained critical bear habitat. The NCDE and the Greater Yellowstone Ecosystem (GYE) are the largest and contain the most grizzlies.

Under federal protection, grizzly numbers grew steadily in much of the species' range. By 2015 the population in the GYE had topped 700, above the federal recovery goal of 500. The USFWS delisted the recovered population two years later. The agency has said it intends to issue, by September 2018, an initial proposal to delist the NCDE population.

"When there's a conflict, our bear specialists move in quickly and resolve issues before it reaches a point where a bear has to be killed."

> If the birth rate is higher than the mortality rate, the population is growing."

DOCUMENTING GROWTH Cecily Costello, FWP bear research biologist, takes a tranquilized grizzly's vitals signs as part of a 10-year NCDE population trend study that showed a 2.3 percent annual increase.

THREE CONDITIONS

The decision to hand NCDE population management authority back to Montana—as well as to Glacier National Park, the Blackfeet Nation, and the Confederated Salish and Kootenai Tribes—would be largely based on three conditions: The habitat must be healthy and abundant; the population must be kept at or above a viable size and well distributed within the ecosystem; and FWP and tribal bear specialists must continue to reduce conflicts to help keep humans safe and reduce unnecessary bear mortality.

The NCDE contains the most intact grizzly bear habitat in the Lower 48. The ecosystem includes Glacier National Park, parts of two Indian reservations and five national forests (containing four wilderness areas), and other state and federal lands. Grizzlies also roam nearby private lands.

The population too is healthy and robust. Scientists determined that by first figuring how many bears lived in the NCDE. In the mid-2000s, the U.S. Geological Survey (USGS) undertook an unprecedented counting project that gathered and analyzed bear hair DNA. The agency calculated an estimated population of 765 grizzlies, a healthy 62 percent of them females.

The next step was determining whether the population was increasing or decreasing. Each year from 2004 to 2014, crews from an interagency team of state, federal, and tribal members captured and tranquilized 25 female grizzlies and fitted them with radio collars. They monitored the bears from airplanes and helicopters to learn how many cubs were born and, if any grizzlies died, the cause of death. "If the birth rate is higher than the mortality rate, the population is growing," says Cecily Costello, FWP grizzly bear research biologist.

Over the 10-year study period, bear researchers found, the population grew an average of 2.3 percent per year—which equates to roughly 1,000 bears today. Researchers also learned that grizzly range is expanding into areas not occupied by bears for decades. State, federal, and tribal agencies continue to monitor the NCDE grizzly population trend and bear mortality.

"The NCDE population is fully recovered

Tom Dickson is editor of Montana Outdoors.

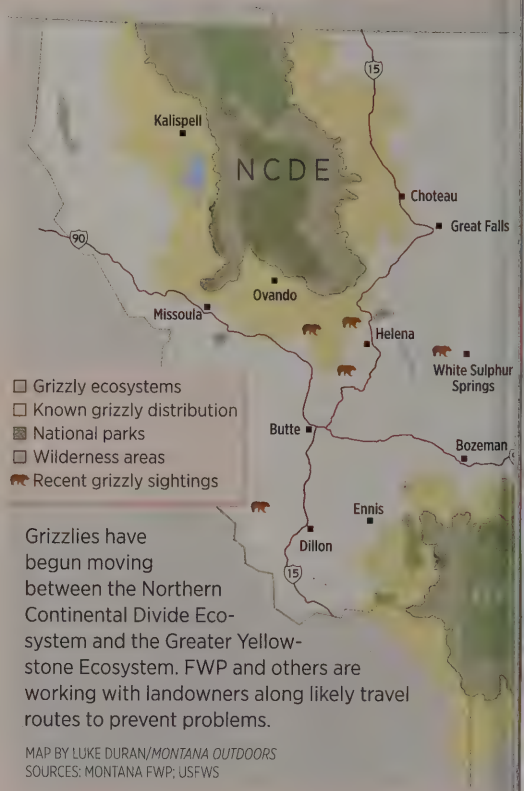
Bridging the genetics gap

The Northern Continental Divide Ecosystem (NCDE) grizzly population is genetically connected to bears in Canada, ensuring a steady influx of new genes. But the Greater Yellowstone Ecosystem (GYE) population is currently isolated. Scientists say the GYE population will remain genetically diverse for the next century, but eventually it will become less so and thus less resilient to disease, environmental changes, and other threats.

Male grizzlies could be trapped from the NCDE and transferred to the GYE to augment the gene pool. But a more ecologically sustainable way to link the two populations is natural movement. It looks like that's already underway.

In recent years, grizzlies have been spotted in the Big Belt and Elkhorn Mountains, the upper Big Hole Valley, and the Little Blackfoot Valley. "The potential for gene flow between the two populations is likely greater now than it's been for decades," says Frank van Manen, a U.S Geological Survey senior research biologist who leads the Interagency Grizzly Bear Study Team.

To safely cross the 70 miles between the currently occupied range of the two populations, a bear needs to stay out of trouble. A recent study led by van Manen and FWP bear research biologist Cecily Costello mapped out the most likely routes male grizzlies would take to travel from the NCDE to the GYE. That information will help land managers and conservation groups work with landowners to set up conservation easements and other habitat protection measures that allow for grizzly bear movement. "The study also helps us build bear tolerance and acceptance among landowners," says Ken McDonald, head of the FWP Wildlife Division. "Instead of chasing bear problems, we want to figure out where bears will be in a few years and start working with landowners and communities to prevent problems before they occur."



Grizzlies have begun moving between the Northern Continental Divide Ecosystem and the Greater Yellowstone Ecosystem. FWP and others are working with landowners along likely travel routes to prevent problems.

MAP BY LUKE DURAN/*MONTANA OUTDOORS*
SOURCES: MONTANA FWP; USFWS

and expanding," says McDonald. "And because it's connected to Canadian populations, it's more genetically diverse than the Yellowstone population."

Grizzly recovery is due partly to the Endangered Species Act and other federal laws and actions that protect the bears and their habitat. For instance, by closing old logging roads, the U.S. Forest Service reduces poaching, vehicle collisions, and other human-caused bear mortality.

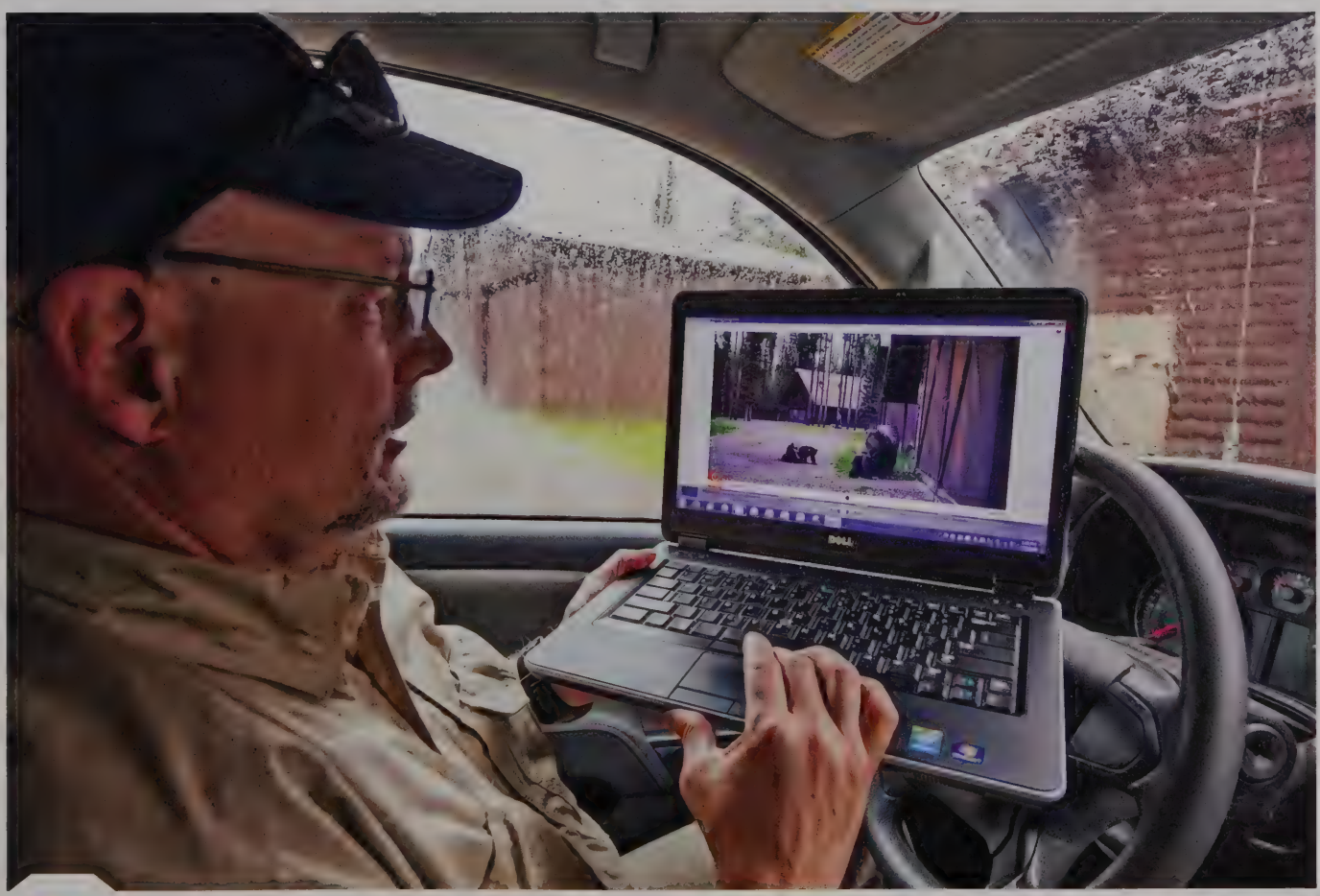
Credit also goes to Montanans' stubborn insistence on keeping the state from growing too tame. "True, civilization has come to Montana, but it hasn't gone mad—not yet anyway.... This is why Montana has grizzly bears. And this is why we like to live here," editor Bill Schneider wrote in a 1975 issue of *Montana Outdoors*.

Montana values the grizzly (check out the patch on FWP uniforms) and takes steps to ensure its survival. State biologists work with landowners, conservation groups, and other agencies to acquire critical grizzly habitat, conduct research, and spread bear-awareness messages to communities, schools, ranchers, campers, and hunters to prevent unnecessary grizzly deaths and protect people and livestock.

CREATING ACCEPTANCE

Creative trouble-shooting also helps. "If we weren't out resolving conflicts, some people would have taken matters into their own hands and we'd have a lot more dead grizzlies," says McDonald. The growth of the NCDE population isn't happening only within wilderness areas and Glacier National Park. It's also occurring on the fringes. Each year more and more grizzlies move from the mountains into areas where people live and work. Speedy, effective response by FWP bear specialists, wildlife biologists, and game wardens to grizzly problems helps build local tolerance. "The greater the tolerance, the fewer the calls for bears to be taken out," says Manley, the Kalispell-area bear management specialist. Ranchers, homeowners, and school administrators who encounter a grizzly for the first time often insist that wildlife agencies kill the bear. "But as people learn that bears don't necessarily pose a threat to their safety or livelihood, and they begin to trust FWP bear management, they are far less likely to demand lethal removal," Manley says.

Over the past two decades, Jamie Jonkel, FWP bear management specialist in Ovando, has helped Blackfoot Valley landowners install miles of electric grizzly-



"By not securing garbage and other bear foods, you're writing their death sentence."

PROBLEM SOLVER Tim Manley looks at images from a remote camera of a grizzly family near a garage north of Polebridge.

LEFT TO RIGHT: MONTANA FWP; AARON TEASDALE

> "We established trust by listening to local concerns and not coming in and acting like we had all the answers."

A BETTER PLACE TO LIVE Above: A grizzly is released after it was captured in a culvert trap and moved to a national forest far from towns, dumps, and other areas containing human food, crop, or garbage temptations. Top: Jamie Jonkel, FWP bear management specialist in Ovando, says a speedy response to problems builds tolerance among landowners in bear country.

resistant fencing, mostly around calving lots, and remove bear attractants. Instead of dumping dead calves or cows into nearby ravines, once a common practice, Blackfoot Valley ranchers now move carcasses to fenced composting sites. "We established trust by listening to local concerns and not coming in and acting like we had all the answers," Jonkel says.

Cooperative solutions work. Grizzly bear conflicts in the valley dropped by 74 percent from 2003 to 2013, even as resident bear numbers grew. "Since 2013, we've continued to see even fewer grizzly conflicts and very few bear mortalities," Jonkel says.

While conflicts have declined where grizzlies are well established, problems have grown as bears repopulate areas where they haven't been seen in decades. In far northwestern Montana, that includes places like Eureka and Libby. On the other side of the Continental Divide, bears have recently ventured more than 100 miles east of the Front to Fort Benton, Chester, Shelby, Dutton, and Stanford.

For decades, grizzlies rarely wandered east of U.S. Highway 89. But as the NCDE population expands, bears follow brushy creek and river bottoms from mountain foothills into open plains, where they were common before white settlement. McDonald says communities and landowners encountering grizzlies for the first time are understandably scared and concerned. "We take those fears seriously and do all we can to protect the safety of people and livestock," he says.

RAPID RESPONDERS

In some places, that means building barriers around things bears like to eat. Electric fence now surrounds human-created food sources throughout grizzly country, from chicken coops, calving areas, and sheep pastures to vineyards, beehives, and corn fields. To thwart grizzly scrounging, Lincoln and Flathead Counties have fenced waste disposal sites. Whitefish restricts residential garbage bin placement, and other towns require bear-proof trash containers. Bear specialists urge homeowners to keep dog food indoors and remove bird feeders (bears love seed and suet). Each fall, Jonkel hires University of Montana students to pick bear-attracting

CLOCKWISE FROM TOP LEFT: LAURA NELSON; AARON TEASDALE; AARON TEASDALE; AARON TEASDALE

GRAIN-FED GRIZZLIES Above: bear tracks in a neighborhood garden in Valier. Right: Bear specialist Mike Madel tests an electric bear-proof fence installed around grain bins near Choteau, east of the Rocky Mountain Front.

> "Electric fence can be a great way to keep bears out of trouble."

apples, plums, and other fruit for homeowners who can't do it themselves. The town of Dupuyer even installed electric fence around its school playground.

Mike Madel, FWP bear specialist in Choteau, says that as bears move east of the Front into agricultural areas, they are attracted to spilled barley and other grain around storage bins. "Electric fence can be a great way to keep bears out of trouble," he says. FWP hopes to find funding to buy a portable 50-gallon industrial vacuum to suck up spilled grain near storage bins, often located within small towns.

Public education is essential and constant. At community "bear fairs," in school auditoriums, and over coffee in kitchens, bear specialists explain where people are most likely to encounter grizzlies and when and how to use bear pepper spray. Wesley Sarmento, a new FWP bear management specialist in Conrad who started in early 2017, says he's already given 50 public talks and set up a website showing grizzly locations. "People want to know when a bear is in the area," he says. "They want to know about the bear management we're doing."

While most bears never get into trouble, some do. Grizzlies that occasionally wander through a yard after sunset or tip a trash bin are usually left alone. But a repeat offender is captured with a snare or culvert trap, then relocated or killed, depending on the threat to human safety and livestock.

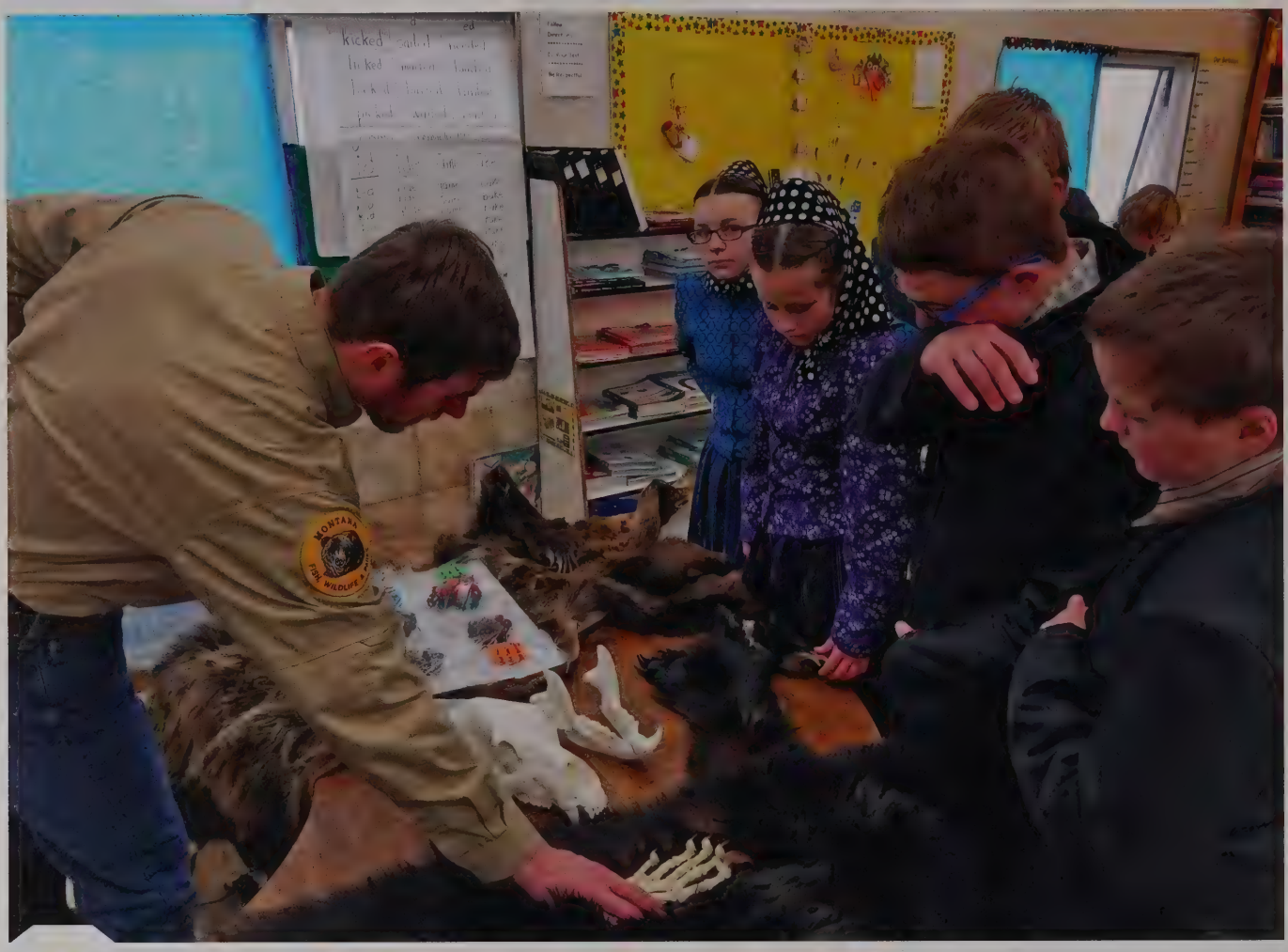
Grizzlies do maim and kill people, though rarely, and usually only in a surprise encounter. Fewer than one person per decade dies of a bear attack in the NCDE, including Glacier National Park, which attracts up to three million visitors each year. The most recent was in 2015 when a mountain biker on a trail in the Flathead National Forest rounded a corner and collided with a bear that then attacked and killed him.

PROTECTING PEOPLE AND BEARS

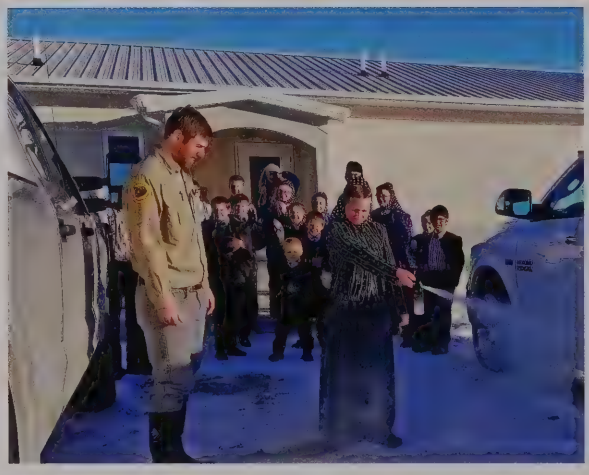
Grizzlies would remain in good hands if delisted, according to Montana officials. "Both we and the federal government remain committed to maintaining the conservation measures that led to the population recovery in the first place," says Martha Williams, FWP director. Removing grizzlies from federal oversight wouldn't remove protections, she says. "They would still be protected from illegal or indiscriminate killing."

Williams points to Montana's healthy wolf, mountain lion, and black bear populations. "There's no reason to think grizzlies won't be just as well conserved," she says.

A major condition of delisting would be federal confidence in Montana's NCDE grizzly "conservation strategy." Now being finalized, the strategy aims to reassure the USFWS—and federal judges who would adjudicate possible lawsuits—that the state, federal agencies, Indian tribes, and others



> "People want to know when bears are in the area and what management we're doing."



SHOW AND TELL Above: Wesley Sarmento, FWP bear management specialist in Conrad, teaches bear biology to students at the New Rockport Hutterite Colony near Choteau, where grizzlies have begun showing up in recent years. Left: Using practice canisters, Sarmento shows children at the Birch Creek Colony near Valier how to use bear spray.

would continue reducing bear conflicts and monitoring grizzly birth and mortality rates, food supplies, and habitat threats. "Montana is firmly committed to conserving the grizzly population for the long term," Williams says. "At the same time, we're equally committed to meeting the needs of communities and landowners having very real problems with grizzlies."

As for hunting, state management could allow for a tightly restricted season that would not endanger the population. "Even so, we recognize that grizzly hunting is a highly charged issue and have no plans to consider it at this point," Williams says.

Montana will continue managing grizzlies as it has in recent years no matter what the federal government decides about delisting. "Either way, we'll still focus on teaching people how to secure food and garbage, showing them how to protect themselves and livestock, and resolving conflicts, just as we are now," Williams says.

Grizzlies have shown they can thrive in a wide range of environments, from wilderness areas to wheat fields. What restricts their range is not habitat security but public tolerance. FWP specialists and others are helping build that. But even in a state where the grizzly has been designated the official state animal, there are limits to what some people can tolerate. "Grizzlies add diversity to the landscape and are part of this ecosystem," says Randy Mannix, who raises cattle in the Blackfoot Valley with his two brothers. "I like seeing them. But we need to protect ourselves and our property, and we can't have bears everywhere. It's just not fair to the people who live here."

PHOTOS: MONTANA FWP

"This is not okay."

FWP teams up with Teton Raptor Center to prevent birds from dying a slow, horrific death in outhouses at state parks and fishing access sites across Montana.

BY KELSEY DAYTON

TOP TO BOTTOM: DIANE DIEBOLD/TETON RAPTOR CENTER; SHUTTERSTOCK

NO WAY OUT Above: Birds that enter pit latrines via ventilation pipes can't escape. Top: A northern saw-whet owl rescued from an outhouse. Sadly, many trapped birds are never discovered.

It's a nightmarish way for anything to die: trapped in darkness, covered by human excrement.

Amy McCarthy, executive director of Teton Raptor Center in Jackson, Wyoming, knew that birds get stuck in open drain pipes, unable to climb the smooth walls or spread their wings to fly out. And she could imagine, with a cringe and a gag, the fate of birds that found themselves burrowing into not just any pipes, but those leading to the bottom of vault toilets.

She'd heard stories of people entering an outhouse and looking down to find two glowing eyes staring back up. But she didn't fully comprehend the horror of a bird dying in such a place until she saw a picture of a pathetic-looking boreal owl in Idaho, surrounded by piles of human waste, peering up through a vault latrine toilet seat opening.

It was 2010, and McCarthy had worked at the raptor center for only a few months. The U.S. Forest Service was circulating the picture to raise awareness of the problem. "My first thoughts were 'This little owl is *where*? *Why*?'" McCarthy says. "And then I thought, 'This is not okay.'"

McCarthy decided to do something about it. Within a year, the raptor center launched the Poo-Poo Project to protect birds by installing screens over pipes leading into vault toilets. McCarthy started with outhouses on nearby national forests using

fabricated rock screens designed to catch stones that kids sometimes try to throw into pipes. But at $100 each, the screens were expensive. They were also complicated to install and blocked ventilation if snow accumulated on top. "That's when we went into innovation mode and created the Poo-Poo Screen," McCarthy says.

In 2013, Teton Raptor Center debuted a screen specially designed to fit on the pipe openings of vault toilets. The screens have since been installed in thousands of outhouses, in all 50 states, including more than 1,300 in Montana. The raptor center has partnered with roughly 375 groups and agencies, including Montana Fish, Wildlife & Parks, the U.S. Forest Service, the Bureau of Land Management, and Audubon chapters. So far, the raptor center has sold more than 11,000 screens.

Missoula Concrete Construction bought several hundred screens to install on its vault toilets. "By purchasing the screens from the center rather than making them ourselves, we're saving birds at the vault toilets we sell and also helping the raptor center with its other bird conservation work," says Adam Bauer, a co-owner of the company.

The screens attach to a small stand that goes over the pipe, leaving a small gap between the screen and opening. That allows air to flow into the outhouse even if snow covers the screen, says David Watson, Teton Raptor Center development director and Poo-Poo Project manager. Each screen costs $30, making it affordable for organizations and agencies to buy in bulk or for individuals who want to purchase a single screen and donate it. The raptor center distributes donated screens nationwide where they are most needed.

Watson says civic groups, birding organizations, schools, and scout troops buy the screens as donations and often help install them at city parks, national forest campgrounds, and other public recreation sites.

The ease of installation and relatively low cost prompted FWP to buy screens for vault toilets at dozens of fishing access sites and state parks, including Makoshika, Medicine Rocks, and Brush Lake in eastern Montana. "We immediately recognized it as an important modification we could do to our vault

> "This open pipe issue is huge for all kinds of wildlife. And it's such a simple solution."

NO ENTRANCE Above: An installed Poo-Poo Screen sits slightly above the exhaust pipe. The design blocks birds while allowing ventilation even if covered in snow. Right: Volunteer Megan Betcher and FWP park maintenance foreman Erik Dion install screens on latrines at Makoshika State Park. FWP has installed screens at state parks and fishing access sites across Montana.

latrines," says Tom Shoush, a park ranger at Makoshika. "The whole concept was clearly thought out, a proven benefit to birds, easy to implement, and cost effective."

Shoush had not known that birds could become trapped in state park toilets. "It was an issue under our radar until we heard about the Poo-Poo Project," he says.

Because the deaths often go unnoticed or unreported, FWP and other states' wildlife agencies don't know how many birds die in vault latrines annually. But the American Bird Conservancy has estimated that each year across the United States tens of thousands of cavity-nesting birds—woodpeckers, bluebirds, kestrels, and small owls—become trapped in various open metal or PVC pipes used for dryer and roof ventilation, irrigation, fencing, road signage, chimneys, and building construction.

A single irrigation standpipe in California contained the remains of more than 200 birds.

Watson wants the Poo-Poo Project to raise awareness of hazards to birds posed not only by vault latrine pipes but all pipes. "Birds see the opening and fly in, either to roost or nest, and then they are trapped and die, usually of dehydration," he says.

The National Audubon Society and American Bird Conservancy are working with the Bureau of Land Management to raise awareness of thousands of open PVC pipes used to mark mining claims across the West. The federal agency now asks mining claimants to replace or cap all open-pipe markers on active mining claims or sites.

The Poo-Poo Project is the only one specifically addressing the outhouse issue. One likely reason for its success is that attaching the screens is both easy and extremely beneficial to birds, says Chris Hammond, an FWP wildlife biologist in Kalispell. After hearing about the project from a colleague, Hammond ordered 75 screens for latrines at state parks and fishing access sites across northwestern Montana.

In central Montana, FWP employees installed screens on 70 vault toilets at fishing access sites. The screens also keep rocks thrown by vandals from falling down the pipes into the toilets. "Because the companies that pump out the waste don't want trash or other debris mixed in, we have to send one of our workers down there to fish out the rocks," says Vicki Robinson, FWP regional Fishing Access Site Program manager in Great Falls. "These screens protect birds and also save us from having to do some real disgusting work."

Watson hopes people who learn about the dangers of open pipes on pit toilets go home and cover their dryer vent or put a screen on their chimney. "The idea of a bird trapped in a pit toilet really attracts people's attention," Watson says. "But a bird being trapped in any type of pipe and slowly dying there is just as horrible. It's so encouraging to see how many people are recognizing the problem and helping us do something about it."

To order Poo-Poo Screens or to make a donation to the program, visit tetonraptorcenter.org or call (307) 203-2551.

NEVER AGAIN A long-eared owl spreads its wings to dry out after being rescued from a vault toilet and cleaned for release. "It was an issue completely under our radar until we heard about the Poo-Poo Project," says one FWP state park ranger.

Kelsey Dayton is editor of Outdoors Unlimited, *the magazine of the Missoula-based Outdoor Writers Association of America. A version of this article originally appeared in* Wyoming Wildlife.

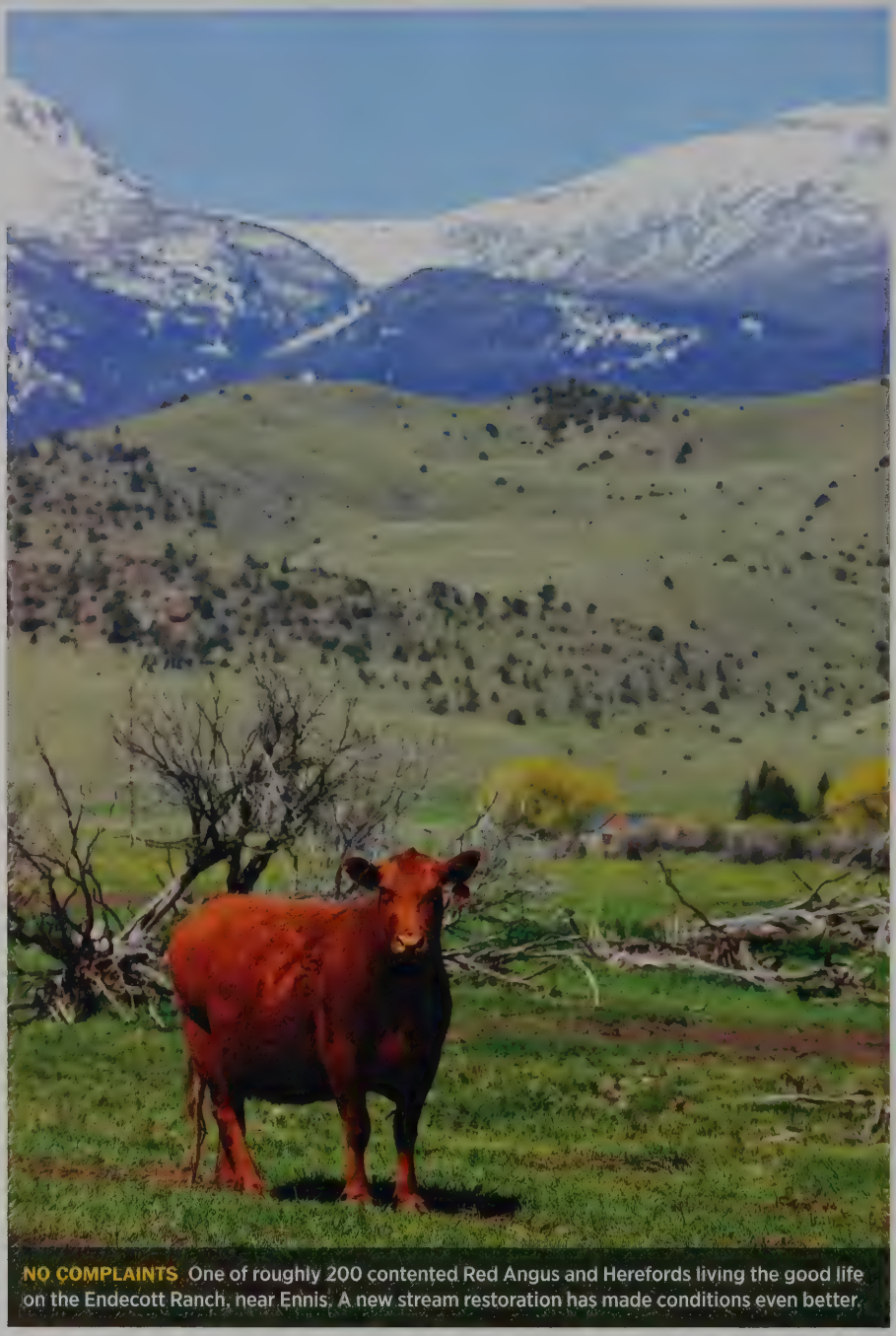
LEFT TO RIGHT: TETON RAPTOR CENTER; TETON RAPTOR CENTER; MONTANA FWP; SHUTTERSTOCK; BLM

HAPPY COWS, HAPPY TROUT

How a watershed coordinator, a rancher, and an FWP fisheries biologist found a way to conserve water and restore habitat on a Madison River tributary.

By John Grassy. Photos by Eliza Wiley

NOW AND THEN Sunni Heikes-Knapton, watershed coordinator for the Madison Conservation District, holds a photo showing what this same stretch of South Meadow Creek looked like in 2010 before restoration: trampled banks, denuded vegetation, and silt-filled stream gravel.



NO COMPLAINTS One of roughly 200 contented Red Angus and Herefords living the good life on the Endecott Ranch, near Ennis. A new stream restoration has made conditions even better.

Cows rule at the Endecott Ranch, near Ennis. From calving to weaning, and throughout the Madison Valley's long, harsh winters, the roughly 200 Red Angus and Herefords get the best of everything. "We've got this operation set up so it works just right for the cows," says Janet Endecott, who runs the livestock operation with her daughter, Rachel. "To keep them happy and healthy, you need good land and good water."

The nexus for happy and healthy on the Endecott Ranch is South Meadow Creek. Originating in the southern Tobacco Root Mountains, the stream meanders east through the ranch's main pastures on its way to the Madison River, one of Montana's most popular trout waters. On days of extreme heat, native willow thickets—a rancher's best friend, Endecott says—offer her cows shade, while in winter they shelter the livestock from frigid winds. In summer, water from the creek irrigates the lush pastures. And at all times, it provides thirsty cattle with an endless source of water.

As is the case on ranches across Montana, cows can enjoy a creek too much. Livestock often congregate at a particular stream stretch, trampling banks while wading in and out. As banks flatten, the stream channel grows wider and shallower, causing the water to warm in the summer sun to temperatures stressful for trout. As cow hooves stir up the stream bottom, silt washes downstream, suffocating fish eggs and filling in gravel where aquatic insects live. And cows can graze willows and other streamside vegetation down to the nubs.

For years, Endecott watched the stream degrade as she herded her cattle in late winter to an adjacent pasture. "When you've got more than 200 cows watering in one area, it can cause quite a bit of damage," she says. "I knew something needed to be done, but I didn't know exactly what."

GOOD TIMING

That was in 2010. At about that same time Sunni Heikes-Knapton, watershed coordinator for the Madison Conservation District, was launching a project on South Meadow Creek. Using a grant from the Montana Department of Natural Resources and Conservation, Heikes-Knapton worked with a team to assess eight of the stream's irrigation diversions. These three- to four-foot-tall dams, often just a few wooden planks blocking part of the stream, divert water into channels that irrigate surrounding pasture. During years of low mountain snowpack and little rain, diversions can draw off all the water in some stream sections, leaving none for trout or cattle.

"Some of the structures were primitive and highly inefficient," says Heikes-Knapton.

"We thought if we could get new ones in a few places there might be a little more water left in the stream."

The conservation district also wanted to know if any irrigation structures impeded the stream's natural functions. Heikes-Knapton asked Pat Clancey, then a Montana Fish, Wildlife & Parks fisheries biologist in Ennis and a member of the irrigation-diversion assessment team, to identify any structures that created waterfalls blocking trout from swimming upstream. One was on the Endecott Ranch. "Only a few fish were large enough to get up and over it," says Clancey, who has since retired.

Clancey also assessed the creek as it meandered through the Endecotts' pasture. He immediately spotted the trampled banks and shallow water in the degraded stretch at the cows' favorite watering spot. "That's a classic problem for trout streams in cow pastures across western Montana," he says. He and Heikes-Knapton proposed improving the stream habitat during the irrigation dam upgrade. "The Endecott Ranch has soft, rich soils prone to damage from livestock," Clancey says. "But those same fertile soils also make it easy for vegetation to recover. It had been done before on other ranches, and I could see we had a great opportunity to turn a bad situation around."

"We thought if we could get new structures in a few places there might be more water left in the stream."

—Sunni Heikes-Knapton

"When you've got more than 200 cows watering in one area, it can cause quite a bit of damage."

—Janet Endecott

"It had been done before on other ranches, and I could see we had a great opportunity to turn a bad situation around."

—Pat Clancey

Heikes-Knapton met with Endecott to present their ideas for improving the stream. Janet recalls her initial response: "You want to do *what*?" The Madison Conservation District was proposing to install several hundred yards of fence on each side of the degraded stream stretch, creating an enclosed riparian recovery zone of about four acres. To allow vegetation to recover, cows would graze the pasture for only a few days each fall. Instead of getting water directly from the creek, the cows would drink from two tanks, filled from a new well.

Looking back several years

DREAM TEAM Madison Conservation District watershed coordinator Sunni Heikes-Knapton, rancher Janet Endecott, and FWP fisheries biologist Pat Clancey cross South Meadow Creek, a tributary of the Madison River that runs through the Endecott Ranch near Ennis.

later, Endecott says her first reaction to the stream-fencing proposal was not surprising. She was used to her livestock having year-round access to the stream. Fencing and water tanks would be an extra cost, she feared. Moving cattle was extra labor.

Yet she'd previously worked with Heikes-Knapton and trusted her. The plan would certainly change the way Endecott managed her cows, and she didn't know how it would turn out. But if the watershed coordinator believed the stream would benefit, she was willing to try.

Besides, Endecott was co-chair of the Madison Conservation District. She understood the need to lead by example. Yet even as she agreed to the proposal, "I was thinking I would get nothing out of it besides the off-stream water," she says. "I would be the nice person who made the stream better. But the ranch wouldn't actually benefit that much."

WORKING AS PLANNED Counterclockwise from above: Janet Endecott welcomes the return of stream-shading willows along the banks of South Meadow Creek; Pat Clancey examines the new irrigation diversion that was part of the creek restoration; an Endecott Ranch cow drinks from a new water tank situated several hundred feet away from the stream.

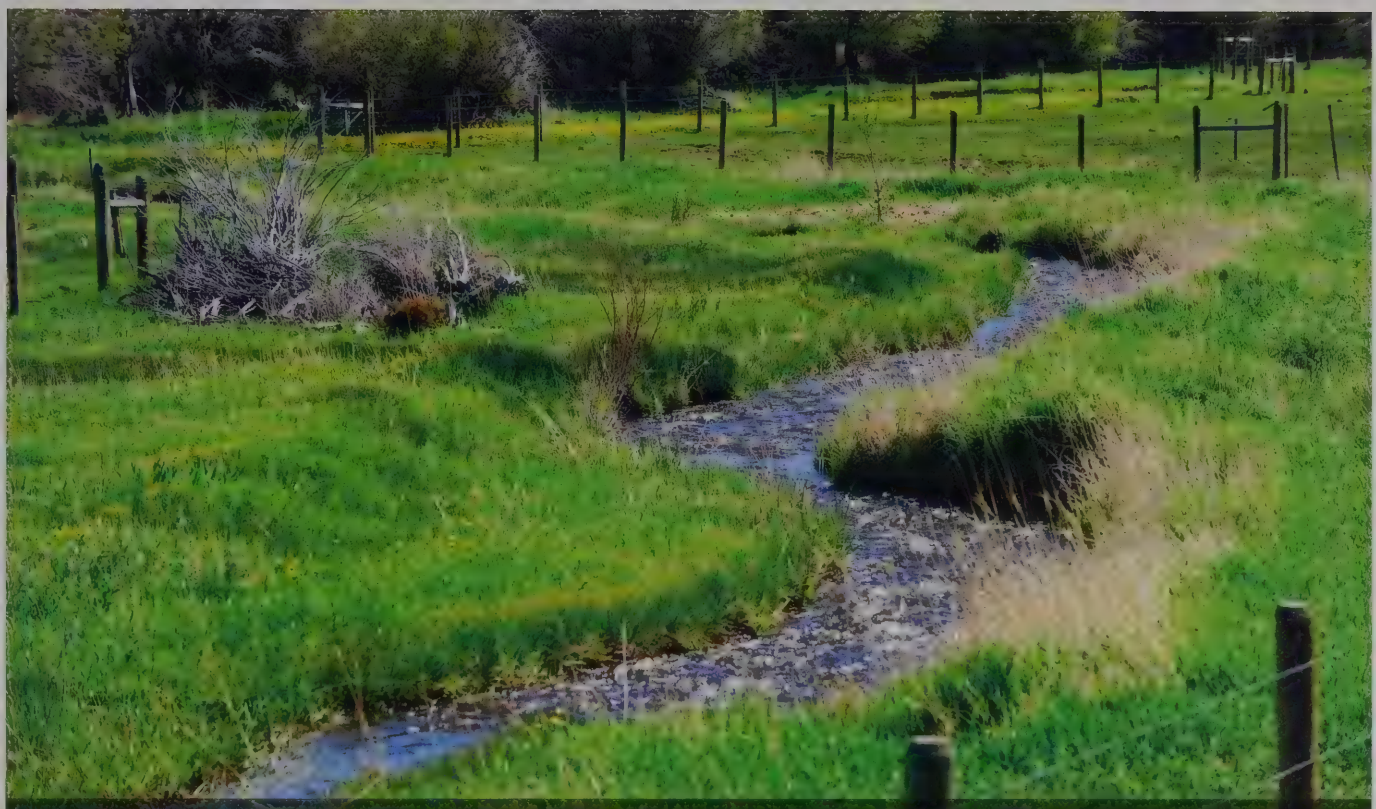
Also helping Endecott get to "yes" was learning she would need to pay only a small portion of the project's total cost for materials and labor. Heikes-Knapton and Clancey found state, federal, and corporate funding for the irrigation structure, well, water tanks, fencing, plumbing, and a creek-crossing structure.

RAPID RECOVERY

The work was finished in late 2012. By spring, "plants were coming in that I'd never seen before," Endecott says, referring to new grasses, forbs, and shrubs. Previously, her cows grazed off the new growth as soon as it emerged. But now, as the growing season continued, she watched grass and wildflowers grow thick and lush. Safe from cattle, plants matured and produced seeds, further enriching the land. Under the new plan, she put cows in the lush streamside pasture just once, for several days in November. Though short, it was one heck of a banquet.

Another pleasant surprise was the new watering system. Because cattle rarely stray far from water, they previously overgrazed the vegetation next to the creek while leaving other pasture untouched. But with water available any time in the tanks, situated several hundred

"This has helped especially in the really cold, nasty weather. There's water any time they want, so they water more regularly."



FOUR-ACRE PARADISE Fenced off from cattle except for a few days each fall, South Meadow Creek has cleared and deepened, banks have stabilized, and grasses and forbs are lush. "It's hard to believe this is the same place it was in 2010," says Janet Endecott, the landowner.

feet from the stream, the cows began grazing elsewhere. "Grass and forbs need periodic grazing. It creates new growth," Endecott says.

More cattle are able to access water, too, and more often. In the past, smaller and meeker cows would grow tired of waiting for a turn at the creek or get pushed to the back of the line. With the herd spread out and open water always available, every cow can drink whenever it wishes. "This has helped especially in the really cold, nasty weather. There's water any time they want, so they water more regularly," Endecott says.

The water tanks also eliminate some of the hard physical labor so common to ranch life. In the dead of the Madison Valley's notoriously brutal winters, Endecott no longer has to hike down to the iced-up creek with a spud bar to chop out places where cows can drink.

John Grassy is an information officer with the Montana Department of Natural Resources and Conservation. Photojournalist Eliza Wiley lives in Helena.

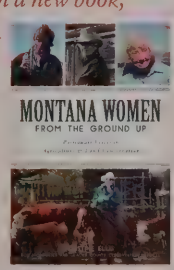
WELCOME BACK, WILLOWS

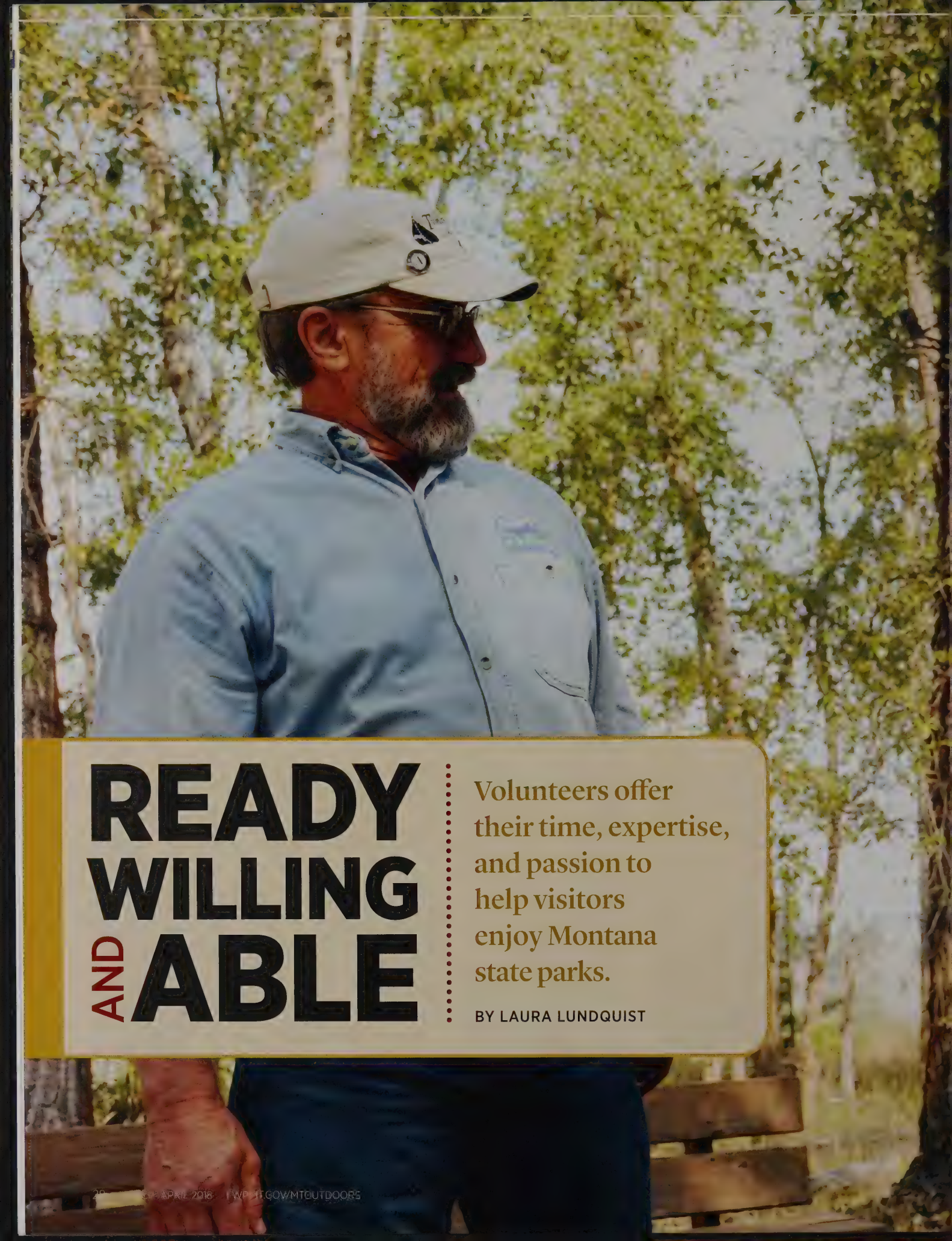
Without constant pressure from cattle, South Meadow Creek is on the mend. The wide, shallow streambed has narrowed and deepened, while bends have created pools where trout overwinter or escape predators. The steady increase in plant growth has stabilized banks and halted erosion. After a couple of years, Janet was happy to see her friends, the willows, returning to the creek bottom. They'd been there all along, trying to grow, but the cows had always grazed them down. As willows and other streamside plants grow taller and lusher, they shade the water, keeping it cooler for trout.

The project has been a win for fish, for livestock, and for the Endecotts. It's also helping the environment miles downstream. "Restoration projects like these that improve tributaries are essential for keeping the Madison River system more resilient to warm temperatures and low flows," says Travis Horton, FWP regional fisheries manager in Bozeman.

The project is reverberating elsewhere, too. In 2015, Endecott persuaded her brother to launch a similar project on nearby Moore's Creek. Many of her neighbors have stopped by to see her restored pasture and new watering system. "I can gently nudge people into thinking about doing something similar," Endecott says. "And I really stress it doesn't have to be a huge project. If a lot of people each do one small thing to improve a stream where it flows through their place, it can make a huge difference."

Rancher Janet Endecott is featured in a new book, Montana Women, from the Ground Up: Passionate Voices in Agriculture and Land Conservation. *Written by Helena author Kris Ellis and published by The History Press, the book is scheduled for release in early May and will be available at local booksellers.*





READY WILLING AND ABLE

Volunteers offer their time, expertise, and passion to help visitors enjoy Montana state parks.

BY LAURA LUNDQUIST

GENEROUS GESTURES Volunteers Leo Perkins (left) and Dale Dufour swap stories at Travelers' Rest State Park near Lolo. The state park is one of many across Montana that relies on volunteers for everything from leading interpretive tours to picking up trash.

PHOTO BY LAURA LINDQUIST

In mid-August, as the orange-gray sky above Travelers' Rest State Park darkened again, park manager Loren Flynn suspected trouble.

Leaves of surrounding cottonwoods fluttered, then flailed, assailed by western winds that eventually whipped up the nearby Lolo Peak Fire. Having already burned 19,000 acres in fits and starts during previous weeks, the fire roared back to life and headed northeast toward the community of Lolo and one of Montana's premier state parks.

The alert went out: Prepare to evacuate Traveler's Rest.

Flynn worried not only about the park buildings and the contents of his office, but also the precious artifacts collection in the visitor center. Travelers' Rest is one of only two sites in Montana where archaeologists have found physical evidence of Lewis and Clark's early 19th-century journey. During a 2002 dig, archaeologists unearthed a blue trade bead, a button, a clump of lead used to make bullets, and fire-cracked rock in a spot that had been used for cooking.

Those and other items, along with an 1803 Harpers Ferry rifle that may have accompanied the expedition, were on display in the visitor center. Now they were threatened by the fast-growing blaze.

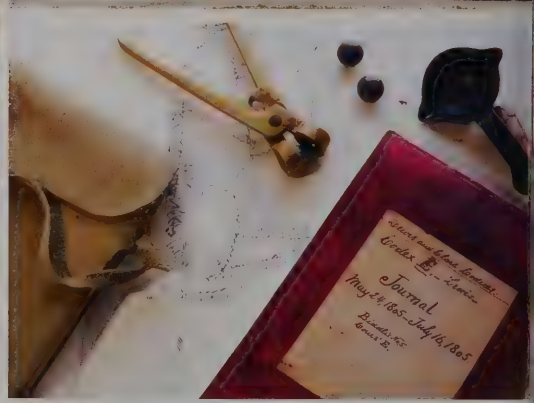
By himself, Flynn would have struggled to get everything out in time. But the park's volunteers answered the call. A few of the regulars, including Dale Dufour, helped pack up the artifacts so they could be shuttled to safety until the danger was past. "We had an art exhibit in there, too. Just in case the fire overran us, we took it all down," Dufour says. "The same thing happened five years ago when the Highway 12 Fire burned. I was out here at night running from one side of the park to the other because big embers were falling everywhere."

> **"I was out here at night running from one side of the park to the other because big embers were falling everywhere."**

Flynn didn't ask Dufour to do that: Dodging wildfires is not a designated volunteer activity. But it shows just how dedicated park volunteers can become.

Deep connections like that are what Montana Fish, Wildlife & Parks park managers try to nurture, because volunteers are as essential to state parks as electricity and running water. "I manage three parks spread over 90 miles with just two employees. We couldn't possibly make it work without volunteers," Flynn says.

LEFT TO RIGHT: MATTHEW ROBERTS; STEVE AKOP; NELSON KENTER; DALE J. DUFOUR; VICKI CORREIA



FIRED UP TO HELP This page: In August 2017, the Lolo Peak Fire raged near Travelers' Rest State Park, threatening the park's buildings and structures as well as a precious collection of Lewis and Clark artifacts. Volunteers helped park employees remove the artifacts and an art exhibit to safety. Fortunately, the fire did not reach the park.

CAMPGROUND COUPLES

Lewis and Clark Caverns became Montana's first state park in 1937. Ever since, people have shown up there and at dozens of subsequent state parks offering to do everything from lead interpretive tours to pick up trash. Volunteer numbers swelled starting in the 1980s, as recreational vehicles became more popular and FWP needed volunteer campground hosts. At that point the agency knew it needed to formalize how it recruited, trained, and managed volunteers, and soon thereafter created a designated volunteer program, says Ken Soderberg, FWP State Parks Volunteer and AmeriCorps Programs specialist.

Because they often stay all season, campground hosts donate more hours than any other volunteers. Most are retired couples who park their RVs at state campgrounds for the summer. Many arrive from other states and happily play host to other campers for the chance to live in some of Montana's most beautiful spots.

Laura Lundquist is a writer in Missoula.

That was the case with Sam and Ginny Garland, who don't own a home and travel the United States year round in their RV. They spent last summer surrounded by eastern Montana badlands while volunteering as campground hosts at Makoshika, near Glendive. "Ginny and I like to pitch in at a well-run park, which is what Makoshika is," says Sam. The Garlands helped mow grass, tend trails, rake leaves, and provide advice to visitors. "We really are people people, and we like being with others who enjoy doing the same things we do, like hiking and camping outdoors."

Everett and Elly Beenken had hosted at different state park campgrounds in the Flathead region, and in 2017 they volunteered to caretake Lone Pine State Park outside Kalispell. Because park manager Brian Schwartz manages two parks in addition to Lone Pine, he depends heavily on the Beenkens, who camp near the Lone Pine entrance. The Beenkens make a good team: Elly loves interacting with visitors while Everett is the outdoor handyman, locking the park gates every night, doing odd repairs, and keeping an eye on the facility and surrounding grounds.

"He does just about everything I need in a pinch," Schwartz says. "I was afraid they wouldn't return. Maybe they'd want to go to another state park. But Everett told me, 'Elly likes it, so we'll come back next year.'"

That's why so many volunteers return, whether for a few days or a whole season: They like belonging to someplace special.

Different types of state parks attract different types of volunteers. Cultural parks, like Travelers' Rest and Chief Plenty Coups, draw history buffs. Bannack State Park, a ghost town and Montana's first territorial capital, attracts volunteers from around the state who enjoy reenacting its history. Bannack is remote—about 40 miles west of Dillon—so you don't find reenactors there every day. But during the park's annual

CROWD PLEASER Left: At Travelers' Rest, volunteer Bruce Mihelish explains to kids how scientists verified Lewis and Clark's presence at the site. Above: Volunteers dig in to help restore vegetation.

Living History Days in September, dozens of volunteers, many dressed in period costume, converge on the ghost town to re-create the gold rush bustle of the 1860s. The town comes alive with miners, shopkeepers, bandits, a blacksmith, and others who portray Bannack's history of the period.

Roughly 1,300 to 1,500 people volunteer at Montana state parks each year. Most help at special events that last just a day or two, like National Public Lands Day or National Trails Day. "Special events like that create a unique environment and experience that make people want to return to help out again and again," Soderberg says. The celebrations draw volunteers to some of Montana's smaller or more remote parks, like Council Grove, near Missoula, or Makoshika.

> **"We really are people people, and we like being with others who enjoy doing the same things we do."**

At Travelers' Rest, the core group of volunteers are mostly Lewis and Clark enthusiasts who don't wait for special events. On any day, visitors can find one or more volunteers out on the park's hiking trails, eager to share their passion. "I love talking to people," says volunteer Bruce Mihelish, a former insurance company manager. "We Lewis and Clark fanatics want to keep the story alive. So every opportunity I've got, it's fun to share the story."

Volunteers Jack Puckett and Colleen Frank take pride in their knowledge of the Native Americans who gathered in the area long before the Corps of Discovery came through in the early 1800s.

Dufour, the Travelers' Rest volunteer who helped during last year's fire, is a former U.S. Forest Service employee. Though also a Lewis and Clark fan, Dufour says he is even more interested in the area's natural history. During his 13 years as a volunteer, Dufour has documented 140 bird species either living in or passing through the park. It's a rare day when visitors see him without a camera. Almost every photograph on the park's Facebook page is his.

Dufour's passion for birds is matched only by that for the park itself. Few things bother him more than discovering that someone has damaged an area or exhibit. "I

LEFT TO RIGHT: JOHN WARNER; MONTANA STATE PARKS

PITCHING IN Left: In 2017, Sam and Ginny Garland, previously of Virginia but now year-round RV travelers, spent the summer as campground hosts at Makoshika State Park near Glendive. "We'd definitely do it again at another Montana state park," says Sam. Above: Volunteers trim shrubs and spread wood chips at Milltown State Park as part of National Trails Day.

CLOCKWISE FROM OPPOSITE PAGE: MONTANA STATE PARKS; VICKI CORREIA; DALE J. DUFOUR; VICKI CORREIA; VICKI CORREIA; MONTANA STATE PARKS

MANY WAYS TO HELP Clockwise from facing page, top left: A volunteer cast of characters assembles each September at Living History Days at Bannack State Park; at Travelers' Rest State Park, volunteer Michael Delaney reenacts Mark Twain; volunteer Ritchie Doyle entertains kids at a summer weekend event; a local Cub Scout pack plants trees; and Salish elder Tim Ryan demonstrates how a fish weir works; volunteer Barbara Melton helps interpret displays and teach Native American history in the visitor center at First Peoples Buffalo Jump.

get really upset with vandalism," Dufour says, his voice rising. "This is 'my' park they're doing that to."

THANKING VOLUNTEERS

Not everyone has as much time or dedication for state parks as Dale Dufour and Everett Beenken. Finding volunteers for some parks is a constant struggle, Soderberg says, especially sites far from urban areas. Retaining volunteers is another challenge. The self-satisfaction gained from donating time to a worthy cause can motivate people, but park managers know volunteers need to feel appreciated, too. So they host thank-you dinners, invite experts to give volunteers-only lectures, or arrange special activities like an evening cruise on Flathead Lake.

Organizing appreciation events and coordinating volunteers can take time from a park manager's busy schedule. "Having volunteers is awesome, but it's not exactly 'free,'" Flynn says. Still, the investment produces big dividends. FWP estimates that volunteers contribute 40,000 hours of work each year—especially helpful recently as park revenue has lagged behind rising costs.

It's likely volunteers will continue to contribute. According to a 2015 Corporation for National and Community Service survey, roughly one-third of Montanans donates time to meet a wide range of needs, making Montana 12th in the nation in volunteerism.

As with most acts of altruism, park volunteering benefits those who give just as much as those who receive. That's the case for Leo Perkins, a retired teacher from Deer Lodge who enjoyed taking his students on Lewis and Clark–related field trips. Volunteering at Travelers' Rest allows him to continue sharing Corps of Discovery lore with young and old alike, he says. And it brings him together with like-minded friends.

Soderberg says that when volunteers become part of a community of other volunteers, park staff, and park visitors, they turn into staunch advocates for the recreational, cultural, and historical sites. "And they speak up not only for that park, but for Montana's entire state park system," he says."

COUNTING WOLVES BY PHONE

How scientists at the University of Montana, FWP, and the U.S. Geological Survey created a more accurate and cost-effective way to monitor the state's wolf population

By **Paul Queneau**

During the past four decades, Diane Boyd has witnessed firsthand the growth of Montana's wolf population from just a handful to more than 800 today. Boyd, a Montana Fish, Wildlife & Parks regional wolf specialist in Kalispell, has also witnessed a marked change in the way FWP counts wolves.

For years, biologists and wolf specialists monitored wolf populations using a radio-collar method she first started using while a college student in Minnesota. Now she and her Montana colleagues employ a method that costs less, uses less labor, and produces more accurate results.

It's based on thousands of phone calls.

Boyd first learned to count wolves in the mid-1970s as an undergraduate student working with renowned wolf biologist David Mech in the dense forests of northern Minnesota. After trapping and tranquilizing a wolf, she and Mech fit it with a collar containing a radio transmitter. Wolves were located later from airplanes using a radio receiver that beeped when it picked up the collar's signal.

In 1979 Boyd moved to Montana, where she continued to study wolves as a University of Montana graduate student. The large carnivores, protected by the Endangered Species Act, were just starting to repopulate the state's northwestern region, where they had not been seen since the 1930s. Wolves had begun crossing from Canada into Glacier National Park and the North Fork of the Flathead River watershed. Boyd set out to trap and collar some of those wolves, refining the techniques she'd learned earlier.

Biologists didn't need to collar every wolf. The carnivores travel in packs, so by following just one wolf, Boyd and other researchers could track the movements of a half-dozen or more.

Boyd spent as many winter days as funding, weather, and pilot availability allowed, crammed into a two-seater airplane, documenting wolf numbers and ranges. "Some winters the weather was so terrible we couldn't fly and find the wolves we'd collared," Boyd says. Yet she and other wolf researchers were eventually able to document, in 1986, the first wolf den in the western United States since the species was extirpated (made regionally extinct) and track individual animals roaming as far as 500 miles to start new packs.

SPIED AND VERIFIED Aerial view of a wolf pack

MIXED BLESSING

Counting wolves in dense, remote forests is difficult and costly. Airplane rental and pilot fees add up to tens of thousands of dollars each year. Because wolves were an endangered species, the U.S. Fish & Wildlife Service paid for research and management. Funding increased further after the federal agency reintroduced wolves to Yellowstone National Park and a central Idaho wilderness in the mid-1990s.

By 2002, the radio-collar method had helped state and federal biologists show that Montana, Idaho, and Wyoming were home to at least 663 wolves and 43 breeding pairs. That exceeded the federal wolf recovery goal for the Northern Rockies of 300 wolves and 30 breeding pairs. The population increase triggered a federal process of delisting wolves as an endangered species. In 2011, following lawsuits and other delays,

Paul Queneau is a freelance writer and the conservation editor of Bugle *magazine.*

One year only $12. **Subscribe today!**

YES! I'd like a year (six issues) of *Montana Outdoors* for just $12.

My/Donor Information: (Required for gift subscription)

Name

Address

City State Zip

Select: 1 Year *6/$12* 2 Years *12/$20* 3 Years *18/$27*

Send a Gift to: (Please print)

Name

Address

City State Zip

Select: 1 Year *6/$12* 2 Years *12/$20* 3 Years *18/$27*

Best Deal!

Payment enclosed Bill me later

Add $3 per year for Canadian subscriptions.
All other foreign subscriptions are $48/year, paid in advance.

For faster service, subscribe by phone: **(800) 678-6668**
Or subscribe on-line: **fwp.mt.gov/mtoutdoors**

U17B

Place
Stamp
Here

MONTANA OUTDOORS
MONTANA FISH WILDLIFE & PARKS
930 W CUSTER AVE
PO BOX 200701
HELENA MT 59620-0701

Don't miss
the photo issue.
SUBSCRIBE TODAY!

Montana was granted full management of its wolf population. It was a mixed blessing.

Though Montana wanted management authority, delisting meant federal funds for monitoring populations would soon dry up.

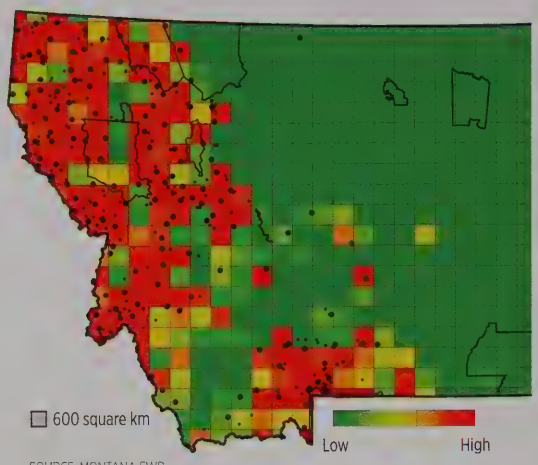
By the time wolves were delisted, five FWP wolf management specialists worked in western Montana. They spent summers trying to trap and collar at least one wolf from every pack. Each year the work became more difficult. Packs were expanding faster than FWP crews could find, trap, and collar wolves. "Even with five wolf specialists, we couldn't keep up with the 500-plus wolves out there," says Justin Gude, head of the FWP wildlife research program. Yet Montana needed accurate population information to ensure that regulated hunting and trapping seasons on wolves, now a game species, maintained a viable and connected population.

Back in 2006, FWP had teamed up with the Cooperative Wildlife Research Unit at the University of Montana to think up new ways to track the rapidly growing wolf population. "We eventually hit on the idea of using patch occupancy modeling (POM)," says Mike Mitchell, who leads the unit. He volunteered his team to work with Gude and others at FWP to study the feasibility of using the method to estimate wolf numbers.

It's a simple idea. With POM, scientists make a grid of the entire state. Each grid cell, or patch, measures 600 square kilometers (232 square miles)—the average wolf pack territory in Montana.

Next comes the "occupancy" part. Scientists determine if each patch on the map is occupied by wolves or not and assign it a probability ranging from 0 to 1. Patches with no wolf sign (dark green in the map on page 38) are close to 0, while those in which wolves

DIGGING DEEPER U of M graduate student Allison Keever and Mike Mitchell, leader of the Cooperative Wildlife Research Unit in Missoula, discuss how wolf harvest from regulated trapping and hunting may affect population dynamics.



SOURCE: MONTANA FWP

PATCH OCCUPANCY MODELING
This 2012 map shows how researchers divide the state into cells, or patches, each 600 square kilometers (232 square miles), the average range of a wolf pack in Montana. The colors show the predicted probability that a wolf pack is in each patch, ranging from near 0 (low) to near 1 (high). The patch probabilities are added up and multiplied by the average pack size to obtain an estimate of Montana's statewide wolf population. The large dots represent wolf packs verified by radio collars, while the small dots represent a harvested wolf, another indicator of wolf pack presence.

have been confirmed (dots on the map), such as with radio collars, are assigned a 1.

Between those two ranges are patches with varying degrees of probability, ranging from near 0 to near 1. For instance, patches with little wolf habitat or those far from patches with verified wolf occurrence might be assigned a 0.25 probability.

Once researchers determine the probability of wolf presence in each patch, they add up the numbers and multiply the total by the average size of a Montana pack: five to seven wolves, depending on the year.

That produces an estimate of how many wolves, living in packs, inhabit the state.

The biggest challenge was figuring out wolf occupancy in each patch. Mitchell and Gude knew that FWP would soon lack funding to collar enough wolves to provide a steady source of occupancy information. So they proposed instead to try using elk and deer hunter observations. "During the general five-week hunting season, there are more people out there, more eyeballs in the woods, than we could ever get any other way," Gude says. Montana deer and elk hunters collectively spend more than two million days afield each year. If wolves exist in a hunting area that has ample public access, the odds are good that somebody will see them.

PROCESS IN PLACE

Fortunately, FWP already had a process for querying hunters. Every year from early December through May, phone surveyors call roughly 100,000 hunters to learn how many game animals were harvested in each hunting district or county and how many days they spent afield. Wildlife managers use the information to help estimate overall harvest and adjust harvest regulations.

Starting in 2007, phone surveyors began also asking, "Did you see any wolves during the five-week deer and elk firearms season?" They have asked it every year since, building a database of sightings.

> "With hunters, we essentially have an army of surveyors who can help us understand what's going on out in the field."

FWP is also using post-season phone surveys to assess the presence and distribution of moose, which biologists are concerned may be declining.

"With hunters, we essentially have an army of surveyors who can help us understand what's going on out in the field," says FWP wildlife biometrician Kevin Podruzny, who coordinates the surveys.

Of course, some hunters may mistake a coyote, dog, or other canid for a wolf, a type of error known in statistics as a "false positive." Also, many wolves aren't seen but are in fact there, something known as a "false negative." To figure out the best way to factor these and other variables into the POM study, Gude and Mitchell enlisted the help of statistics and population modeling experts at the U.S. Geological Survey Patuxent Wildlife Research Center in Maryland.

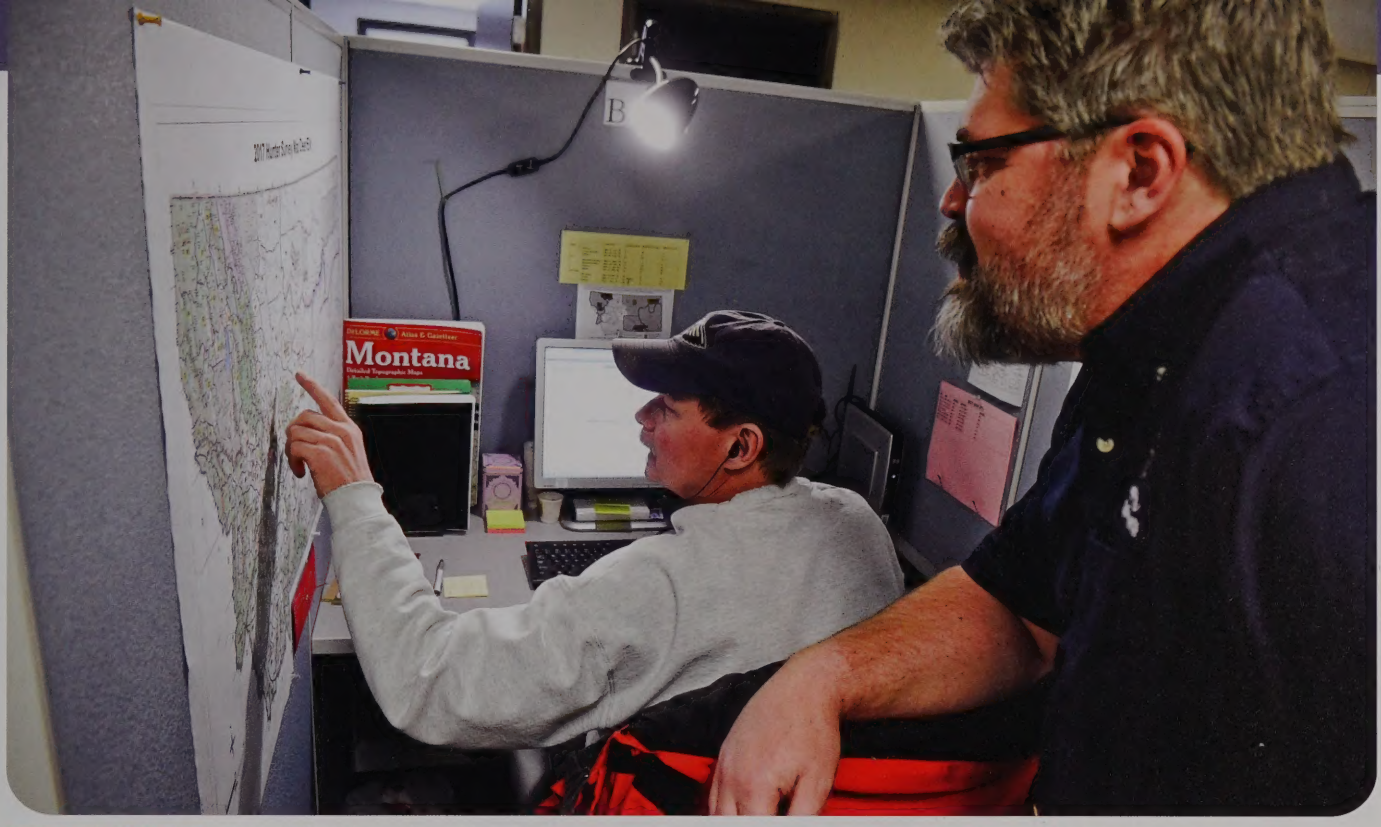
"When you go out and count animals, you can be sure you're missing some because you can't see or hear everything that's in the woods," explains Jim Nichols, a senior scientist at the center. "That requires a set of statistical models to factor in that variable."

The same logic applies to false positives. Based on detailed information gathered by FWP biologists during previous wolf surveys, POM researchers knew that the likelihood of a single hunter mistaking a coyote, dog, or other canid for a wolf, during a particular week of the deer and elk season in any given patch, is about 1 in 10. The odds decline to 1 in 100 if two hunters saw wolves. And if three hunters reported seeing wolves in the same area in one week, the odds that all three were mistaken drop further, to about 1 in 1,000.

To factor out false negatives and ensure no anti-wolf bias influenced hunters' reports, FWP set an extremely high bar for classifying patches as occupied: In any given week of the deer and elk firearms season, at least three hunters had to have each seen two or more wolves (indicating a pack).

To test the accuracy of the POM method, researchers compared hunter phone survey results from 2007 to 2009 to data from the traditional trap-and-collar method. At the time, FWP still maintained a full team of wildlife biologists and wolf management specialists using radio collars to provide minimum population estimates. Though the POM numbers were higher, the two methods tracked almost exactly over the three-year period. "We got excited but also really skeptical because, as researchers, we don't trust results that look too correct," Mitchell says. "So we picked the data apart and tried to find some reason that it might be wrong. But we just couldn't."

POM confirmed that the traditional



"SEE ANY WOLVES?" FWP wildlife biometrician Kevin Podruzny (right), who coordinates the department's annual winter survey of hunters, discusses a wolf sighting by an elk hunter with phone surveyor Butch Beaudry. For years phone surveyors have asked big game hunters (below) about their deer and elk hunting success. Since 2007, they've also asked about wolf sightings.

approach had been underestimating wolf numbers. "For years, what we publicized were Montana's 'minimum' wolf populations, because that's the number we could substantiate," Gude says. "We always knew more wolves were out there, but if the wolf management specialists couldn't trap them to verify sightings, we couldn't include those wolves in our population count." FWP knew it was underestimating wolf numbers, says Gude, "but that ensured we were meeting the federal population recovery goals, which was our priority at the time."

The POM method estimated that the statewide Montana wolf population was 1.34 to 1.46 times the minimum counts for each year of the survey—about what FWP had previously suspected, Gude says.

TOP TO BOTTOM: THOM BRIDGE; ED COYLE

AFFORDABLE AND ACCURATE

The POM results were so solid that FWP has transitioned to using it to officially estimate Montana's annual wolf population. Thanks to Federal Aid in Wildlife Restoration (Pittman-Robertson) funding, plus a $50,000 grant from the Rocky Mountain Elk Foundation, Mitchell's graduate students are verifying the model's accuracy by examining how wolf hunting and trapping affect average pack and territory size. "We want to be sure both the patch size and wolf numbers per pack we're using in our population models remain accurate," Mitchell says.

FWP biologists and wolf specialists also continue to look for and collar wolves. For instance, when phone surveys report previously unknown wolf locations, FWP crews head into the field to verify the existence of those animals. Crews also monitor packs that contain wolves with radio collars, especially in areas where the carnivores are known to attack cattle or sheep, as required by state law. The information helps wolf specialists respond to livestock depredation problems. It also goes into the POM model, giving researchers information to compare with phone survey results.

But for estimating Montana's wolf population, POM is the more affordable and accurate choice. "We were really lucky it has worked out so well," Gude says. "We knew that so many deer and elk hunters are out there that some of them have to be seeing wolves. And it turns out they are."

FWP harvest surveyors are still calling hunters and will continue through May.

Building confidence with science

BY TOM DICKSON

One afternoon last summer, I went fishing on the Missouri River near Craig. I didn't catch a single trout, didn't see one caught, or even see a rise.

If I hadn't known better, I'd have thought there were no fish in the river.

But I did know better.

I knew that the Missouri in that stretch was packed with 4,043 trout per mile. The information came courtesy of FWP fisheries biologists. Each spring they use standardized electroshocking protocol to make an objective, statistically valid estimate of trout populations on the Missouri and other Montana rivers.

Personal observation—also known as anecdotal evidence—only goes so far when it comes to figuring out what's up with Montana's fish and wildlife, much less how to manage them. One person sees a big herd of muleys where someone else doesn't see a single deer all day. An angler catches a dozen walleye on Fort Peck Reservoir while another can't catch a fish to save his life. Such incidents might make for interesting stories at work on Monday morning, but what do they signify? And how could Montana manage mule deer and the Fort Peck walleye fishery on such reports, which are often unverifiable and even contradictory?

Montanans recognized the limitations of anecdotal evidence long ago, when they created this department. At first the agency focused solely on catching poachers, trespassers, and other lawbreakers. Important work, to be sure, but Montanans and their elected officials soon realized they also needed help figuring out how many bighorn sheep could be harvested each year, when trout fishing seasons should open and close, and what could be done to restore waterfowl numbers. They also could see that opposing interest groups often offered contradictory anecdotal evidence, and that each group wanted the state to rely solely on *its* evidence.

So the state hired professional biologists, who use the scientific method. They start with an important question, like, "Why are elk numbers declining in the upper Bitterroot?" They next pose a hypothesis, such as, "Increasing numbers of wolves are causing the decline." Then they structure a detailed experiment that proves or disproves the hypothesis and often (though not always) answers the original question. (In this particular study, conducted during the early 2010s, it turned out that mountain lions, not wolves, were the leading cause of lower elk numbers in the upper Bitterroot.)

Information culled from such experiments, then rigorously analyzed for flaws and inconsistencies, is called empirical evidence. It's what FWP uses to manage the state's fish and wildlife—with pretty decent results, too. Montana is home to some of the nation's healthiest, most abundant game and nongame populations and offers vast opportunities to experience that bounty.

Thank you, scientific method.

Not that anecdotal evidence lacks value in fish and wildlife management. It alerts biologists to possible problems and raises questions that trigger the scientific method.

It's also how the rest of us relate to and best understand the natural world. "The danger in scorning the anecdotal is that science gets too far removed from the actual experience of life, losing sight of the fact that mathematical averages and other such measures are always abstractions," writes Nicholas Carr, a best-selling author specializing in technology and culture.

Conservation agencies that dismiss the personal experiences of the people they serve risk losing credibility and public support.

FWP can't ignore the anecdotal, yet we can't manage the state's fish and wildlife on it, either. An anecdote is a story without proof. And FWP needs to prove that its recommendations and actions are trustworthy. Such proof comes only from objective scientific study that corrects for bias and one-time occurrences.

In the hands of experts, science builds confidence—that the chemotherapy your oncologist recommends is the right treatment, that the commercial jet you're flying in won't crash, and that the elk quota FWP biologists propose for your hunting district will sustain a healthy herd and plenty of hunting opportunities.

Fishing, wildlife photography, and hunting are largely about faith. You need to believe that the animals are there, that you're not just taking a walk with a rod, camera, or gun. Without faith, you'd call it quits. With it, you stick things out.

After getting skunked on the Missouri, I was tempted to hang it up for a while. Instead, I returned the next day, confident that more than 4,000 trout were swimming in each mile of that stretch of river.

I'm not the greatest angler, but I figured the odds were good enough that even I could catch a few.

Tom Dickson is editor of Montana Outdoors.

ILLUSTRATION BY STAN FELLOWS

JOHN CARLSON

SCIENTIFIC NAME
Loxia is derived from the ancient Greek word *loxos*, which means "crosswise." The Latin word *curvirostra* means "curved bill."

Red crossbill

Loxia curvirostra By Julie Lue

Red crossbills don't visit my yard every year. But when they do, my family and I sometimes see dozens every day. They decorate the trees with their brick-red or olive plumage, while calling out with springtime chirps even in winter. Their presence reminds us to check the ponderosa pines near our house. We almost always find a big crop of cones, packed with seeds that provide one of the crossbills' main food sources. If we're lucky, the birds stay to nest and raise their young before they leave in search of another productive grove.

APPEARANCE

These sturdy-looking finches are about the same size as bluebirds, but with bulkier heads and necks. Males are rusty red or reddish gold with a dark brown tail and wings. Females are usually olive green to yellowish, also with a dark tail and wings. Juveniles have streaky brown-and-white coloring and look a bit like pine siskins. The young leave the nest with uncrossed bills. By the time they are about a month old, they develop the species' distinctive feature: a large, curved bill with tips that cross. Of all the birds in the world, only the six crossbill species have this characteristic.

Julie Lue is a writer in Florence.

FOOD

Red crossbills are cone specialists. Their specially adapted bills allow them to pry open the cones of pine, spruce, Douglas fir, and hemlock trees. To reach the seeds, a crossbill inserts its partially open bill into a cone and bites. The curved tips push up and down to open the tightly closed scales. Crossbills also consume other seeds and insects, as well as snow or water every day. A clean water source may attract them to your yard.

CALL

Red crossbills make a variety of calls, but their flight call—*kip-kip* or *jip-jip*—is probably the easiest to recognize. In North America, researchers have identified 10 different types of flight calls. Birds with different "call types" act somewhat like different subspecies or even species. They don't interbreed, and their beak size and preferred food differ. Types with bigger bills tackle large cones like those of the ponderosa pine, while those with smaller bills specialize in the smaller cones produced by spruce or Douglas fir. In 2017, scientists split birds with one of these call types off from the red crossbill and recognized them as members of a unique species, the Cassia crossbill.

BREEDING

Though most birds nest in spring, red crossbills may start their families anytime from late winter to early fall, as long as they find enough cones. Parents can raise more than one brood each year, and sometimes young crossbills breed even before they have grown their adult plumage.

A female crossbill incubates her eggs for about two weeks in a well-camouflaged, bowl-shaped nest. After the eggs hatch, both parents feed the chicks a paste of regurgitated seeds and, a week or so later, whole seeds. Two to three weeks after that, the entire crossbill family abandons the nest, though adults still help provide food until the young become skilled at opening tough cones.

In the Bitterroot Valley, I once found crossbills nesting in early March. I spotted a female carrying dried grass to a clump of ponderosa needles near the end of a branch. Inside the clump, barely visible, was her softball-sized nest of grass, pine needles, and a single feather. Five weeks later, three young crossbills flew away.

HABITAT AND RANGE

Red crossbills live in mature coniferous forests throughout much of North America and parts of Eurasia. In Montana, they show up sporadically any time of year in all but the northeastern corner, where you might see them during winter. These nomadic birds follow their food supply from grove to grove. Along the way, congregations of red crossbills may appear in "irruptions": sudden migrations of large flocks to unexpected places.

CONSERVATION STATUS

Red crossbills are both common and abundant in Montana. Because they depend heavily on older trees, which produce the most generous cone crops, populations may be vulnerable to the loss of mature forests.

Montana State Library
3 0864 1007 0166 6

PARTING SHOT

HAPPY TO HELP Volunteer Barbara Melton shows kids how to use traditional Native American toys next to a tepee at First Peoples Buffalo Jump State Park. See page 28 to learn why she and others donate their time, energy, and passion to FWP state parks. Photo by Montana State Parks/FWP.

Montana Fish, Wildlife & Parks

On-line: **fwp.mt.gov/mtoutdoors**
Subscriptions: **800-678-6668**
Find us on Facebook Montana Outdoors Magazine

MONTANA OUTDOORS $3.50
0 3>
0 74470 88810 9